			Deliverab	le Review Form		
1	Project Informati	on:				STORES OF SHEET STORES
	Project Name:	Olin Chemical Superfu	und Site			
	Project Number:	6107-11-0016		Project Manager:	Peter Thompson	
	Document Name:	Data Validation Repor	t - November 2	011 Slurry Wall / Cap		
	Document Revisio	n Number:		Revision Date:		
	Prepared By:					
2	and conformance performed by:	: This document has be to client requirements a				
	Subject Area(s):	Initial Data Validation	011			
	Printed Name:	Wolfsan	Celice his			
	Signature:	11/11	er dela		Date: 12	19/20.1
	Subject Area(s):	Senior Data Validation				
	Printed Name:	Chins (2	reard			1
	Signature:	- Jun Re	un		Date: 12	415 11
	Subject Area(s):	QC Review				, ,
	Printed Name:	Kelly Chatte	ecton			
	Signature:	Billy Chatt	-		Date:/_0	9/12
	and conformance to Reviews performed List of reviewed Tale Created by: *\(\begin{align*}{c}\) Certifying Project.	ables/Figures/Appendice  KJC 12/05/11  ables/Figures/Appendice  bles/Figures/Appendice  color for for for for for for for for for f	es: Tabl Checked by: es: Tabl Checked by: es: Tabl Checked by: es: Tabl Checked by: es: Checked by:	t has been reviewed ar	Date:  Date:  Date:  Date:  Date:  Date:  Date:  Date:	more room is needed).
	Signature:				Date:	
5		Principal: I certify that the company's standard Michael Murphy			nd edited prior to releas	se and is in
	Signature:	A 0 A	mylin	,	Date:	12/12
	Policy ES-4 Contr	cact Requirements: Contract Standard Contract St	and was check ds to PWAS/oth formation. of the contract	ked & stamped by an C ner standard company of tifirst, then return the	Vork Order, Change  OCA or MACTEC Attorn  contracts shall be revie  m to MACTEC for our	wed by an OCA. See

Back of form to be completed by Annette\Project Assistant.

Deliverable Review For	m (Continued)
Sections 7-9 to be Completed by A	Annette\Project Assistant
7 Copy Editing: This document has been checked to ensure corre missing text, figures, tables); accuracy (index, page numbers, inter specified format and style requirements (whether MACTEC format was performed by:  Print Name:  Annette Savastano  Signature:	nal references); continuity of style: and conformance to or client requested format). Copy editing of this document
8 Policy ES-4 Requirements (Proposals, Reports & Other Client	Deliverables): Check all that apply below.
MACTEC's copy is a "duplicate original" of the client's ori This is a Draft - Transmittal signed by Principal is attache X This is a Final - Project Manager & Principal wet signatur X And all Tables/Figures/Appendices have wet initials for This is a PDF electronic delivery sent via email. A printo and a copy of the transmittal email sent to the client is a  If Absentee Signature was used - Approval from absente Absentee Signature Policy Update - The authorized examples of the permission." Documentation of permission.	iginal and is stamped "File Copy" and to Client's & MACTEC's File Copy ares on Client's & MACTEC's File Copy Reviewed By/Checked By per QA Policy at of the deliverable that was sent to client attached to the printout and stamped File Copy attached to File Copy (see policy update below), amployee should sign their own name and the phrase
9 Timeliness Database: X NA	
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### AMEC E&I, Inc.

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### **FILE COPY**

				RAN	ISMITTA	AL LETT	ER		
To: James Casi	hwell				1	Date:	Ja	nuar	y 12, 201 <b>3</b>
Olin Corpor	ation				(	Client:	Ol	in	
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Suite 200									
Cleveland,	Tennessee 373	12			A	AMEC PI	V: 61	07-	11-0016.12
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x information	□ purc	hasing	REM	ARK					he following data validation summary
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	Cleveland, Tennessee 37312  ormation purchasing construction  minents and/or approval see remarks  Number Revision No. Co  1 - 2 - 3  3								
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To: James Cashwell From: Chris Ricardi Date: January 10, 2012

Subject: Interim Response Steps Work Plan Slurry Wall Monitoring Program 4Q11 – November

2011

DATA VALIDATION REPORT
NOVEMBER 2011 SLURRY WALL GROUNDWATER, SURFACE WATER AND SEDIMENT
OLIN CHEMICAL SUPERFUND SITE
WILMINGTON, MASSACHUSETTS

TestAmerica Laboratories Data Sets 360-37491-1, 360-37526-1, 360-37552-1, 37595-1, and 360-37596-1

#### 1.0 INTRODUCTION

Groundwater, surface water, and sediment samples were collected from the Olin Chemical Superfund Site from November 8 to November 11, 2011. Samples were analyzed by TestAmerica Laboratories in Westfield, Massachusetts. Data were reported in sample delivery groups (SDGs) 360-37491-1, 360-37526-1, 360-37552-1, 360-37595-1, and 360-37596-1. A summary of samples included in this review is contained in Table 1. Samples reviewed in this report were analyzed for the following U.S. Environmental Protection Agency (USEPA) SW-846 (USEPA, 1996), USEPA wastewater (USEPA, 1993), or Standard Methods (APHA, 1995):

- dissolved metals (aluminum and chromium) by USEPA Method 6010B in groundwater
- dissolved and total metals (aluminum, chromium, and sodium) by USEPA Method 6010B in surface water
- total metals (aluminum, chromium, and iron) By USEPA Method 6010B in sediment
- general chemistry analyses for ammonia by USEPA Method 350.1 (Lachat 10-107-06-1B), chloride, nitrate, nitrite, and sulfate by USEPA Method 300, and specific conductance by SM 2510B

The Final Interim Response Steps Work Plan (IRSWP) MACTEC Engineering and Consulting, Inc. (MACTEC, 2007) and the Massachusetts Department of Environmental Protection (MassDEP) Compendium of Quality Assurance and Quality Control Requirements and Performance Standards for Selected Analytical Methods Used in Support of Response Actions for the Massachusetts Contingency Plan (MCP) (MassDEP, 2010) were used as references during the review. Analytical packages were reviewed using the Level 1 Data Quality Evaluation checklists that were developed for the Olin Wilmington monitoring tasks. Final sample results are presented on data summaries in Table 2. A summary of data validation actions and associated qualifier reason codes is presented on Table 3.



### 2.0 METALS

Data were reviewed for the following parameters:

- \* Data Completeness
- \* Holding Time
- \* Blanks
  - Laboratory Control Sample/Laboratory Control Sample Duplicate Analysis
- \* Matrix Spike Analysis
- \* Field Duplicate Results
- Detection LimitsDissolved vs. Total Metals Comparison
- \* = indicates that criteria were met for this parameter

### Laboratory Control Sample/Laboratory Control Sample Duplicate Analysis

### SDG 360-37595-1

The LCS/LCSD percent recoveries of aluminum (170, 169, 197, and 221) and iron (154, 156, 167, and 176) exceeded the upper QC limit of 120. Sample results for aluminum and iron were qualified estimated (J).

### Dissolved vs. Total Metals Comparison

#### SDG 360-37491-1

Dissolved sodium concentrations were over ten percent greater than total sodium concentrations in a subset of surface water samples in SDG 360-37491-1 as presented in the table below. The results for total and dissolved sodium in these samples were qualified estimated (J).

SDG	Fraction	Lab Sample ID	Field Sample ID	Sodium Result (µg/L)	% Dissolved amount is greater than Total amount	Final Qualifier
360-37491-1	Dissolved	360-37491-2	OC-SW-ISCO1	98000	19	J
360-37491-1	Total	360-37491-2	OC-SW-ISCO1	89000	19	J
360-37491-1	Dissolved	360-37491-4	OC-SW-PZ-16RR	130000	18	J
360-37491-1	Total	360-37491-4	OC-SW-PZ-16RR	93000	10	J
360-37491-1	Dissolved	360-37491-5	OC-SW-PZ-17RR	140000	17	J
360-37491-1	Total	360-37491-5	OC-SW-PZ-17RR	120000	17	J
360-37491-1	Dissolved	360-37491-7	OC-SW-SD-17	140000	17	J
360-37491-1	Total	360-37491-7	OC-SW-SD-17	120000	17	J
360-37491-1	Dissolved	360-37491-8	OC-SW-PZ-18R-DUP	96000	16	J
360-37491-1	Total	360-37491-8	OC-SW-PZ-18R-DUP	83000	10	J



### 3.0 GENERAL CHEMISTRY - Ammonia, Chloride, Sulfate, Nitrate, Nitrite, and Specific Conductance

Data were reviewed for the following parameters:

- \* Data Completeness
- \* Holding Time
- \* Blanks
- \* Matrix Spike Analysis
- Field Duplicate Analysis
- Laboratory Duplicate Analysis
- Laboratory Control Sample/Laboratory Control Sample Duplicate Analysis
   Detection Limits
- \* = indicates that criteria were met for this parameter

### **Detection Limits**

#### SDG 360-37491-1

Samples OC-SW-ISCO3, OC-SW-PZ16RR, and OC-SW-PZ17RR were analyzed at a dilution due to chloride, and the reporting limits for nitrite are elevated.

Unless discussed above, sample results are interpreted to be usable as reported by TestAmerica.

Chris Ricards	1/10/2012	
Chris Ricardi, NRCC-EAC Senior Chemist	Date	
Michael Murphy Project Principal		



### References:

- American Public Health Association (APHA), 1995. "Standard Methods for Examination of Water and Wastewater"; 19th Edition; APHA, 1015 Fifteenth St., NW. Washington, D.C. 20005.
- MACTEC Engineering and Consulting, Inc. (MACTEC), 2007. "Final Interim Response Steps Work Plan"; Olin Chemical Superfund Site; 51 Eames Street, Wilmington, Massachusetts; August 8, 2007.
- Massachusetts Department of Environmental Protection (MassDEP), 2010. "The Compendium of Quality Assurance and Quality Control Requirements and Performance Standards for Selected Analytical Methods Used in Support of Response Actions for the Massachusetts Contingency Plan (MCP)"; Bureau of Waste Site Cleanup; 1 Winter Street, Boston, Massachusetts 02108; WSC-CAM; July 2010.
- U.S. Environmental Protection Agency (USEPA), 1993. "Methods for Chemical Analysis and Water and Wastes (MCAWW)", EPA/600/4-79-020 (March 1983) with updates and supplements EPA/600/4-91-010 (June 1991), EPA/600/R-92-129 (August 1992) and EPA/600/R-93-100 (August 1993).
- USEPA, 1996. "Test Methods for Evaluating Solid Waste"; Laboratory Manual Physical/Chemical Methods; Office of Solid Waste and Emergency Response; Washington, DC; SW-846; November 1986; Revision 4 -December 1996.

Table 1 Sample Summary Data Validation Report

### November 2011 Slurry Wall / Cap Groundwater, Surface Water and Sediment Olin Chemical Superfund Site

Wilmington, Massachusetts

						E350.1		
				SW846 6010B Total	SW846 6010B Filtered	(QuickChem 10-107-06-1-B)	A2510B	40CFR136A 300.0
Lab Sample ID	Location	Sample ID	Sample Date	Total	riitereu	10-107-00-1-15)	AZJIUD	300.0
Groundwater		•	•					
360-37526-1	GW-78S	OC-GW-78S	11/9/2011		2	1	1	2
360-37526-2	GW-35S	OC-GW-35S	11/9/2011		2	1	1	2
360-37526-3	GW-201S	OC-GW-201S	11/9/2011		2	1	1	2
360-37526-4	GW-201S	OC-GW-201S-DUP	11/9/2011		2	1	1	2
360-37526-5	GW-79S	OC-GW-79S	11/9/2011		2	1	1	2
360-37526-6	PZ-16RR	OC-PZ-16RR	11/9/2011		2	1	1	2
360-37526-7	PZ-17RR	OC-PZ-17RR	11/9/2011		2	1	1	2
360-37526-8	PZ-18R	OC-PZ-18R	11/9/2011		2	1	1	2
360-37552-1	GW-CA1	OC-GW-CA1	11/10/2011		2	1	1	2
360-37552-2	GW-42S	OC-GW-42S	11/10/2011		2	1	1	2
360-37552-3	GW-43SR	OC-GW-43SR	11/10/2011		2	1	1	2
360-37552-4	GW-34SR	OC-GW-34SR	11/10/2011		2	1	1	2
360-37552-5	GW-34D	OC-GW-34D	11/10/2011		2	1	1	2
360-37552-6	GW-202S	OC-GW-202S	11/10/2011		2	1	1	2
360-37552-7	GW-202D	OC-GW-202D	11/10/2011		2	1	1	2
360-37552-8	PZ-24	OC-PZ-24	11/10/2011		2	1	1	2
360-37552-9	PZ-25	OC-PZ-25	11/10/2011		2	1	1	2
360-37596-1	GW-26	OC-GW-26	11/11/2011		2	1	1	2
360-37596-2	GW-10s	OC-GW-10s	11/11/2011		2	1	1	2
360-37596-3	GW-76s	OC-GW-76s	11/11/2011		2	1	1	2
360-37596-4	GW-24	OC-GW-24	11/11/2011		2	1	1	2
360-37596-5	GW-25	OC-GW-25	11/11/2011		2	1	1	2
Surface Water								
360-37491-1	ISCO1	OC-SW-ISCO1	11/8/2011	3	3	1	1	4
360-37491-2	ISCO2	OC-SW-ISCO2	11/8/2011	3	3	1	1	4
360-37491-3	ISCO3	OC-SW-ISCO3	11/8/2011	3	3	1	1	4
360-37491-4	PZ-16RR	OC-SW-PZ16RR	11/8/2011	3	3	1	1	4
360-37491-5	PZ-17RR	OC-SW-PZ17RR	11/8/2011	3	3	1	1	4
360-37491-6	PZ-18R	OC-SW-PZ18R	11/8/2011	3	3	1	1	4
360-37491-7	SD-17	OC-SW-SD17	11/8/2011	3	3	1	1	4
360-37491-8	PZ-18R	OC-SW-PZ18R-DUP	11/8/2011	3	3	1	1	4

### Table 1 Sample Summary

### **Data Validation Report**

### November 2011 Slurry Wall / Cap Groundwater, Surface Water and Sediment Olin Chemical Superfund Site

Wilmington, Massachusetts

Lab Sample ID	Location	Sample ID	Sample Date	SW846 6010B Total	SW846 6010B Filtered	E350.1 (QuickChem 10-107-06-1-B)	A2510B	40CFR136A 300.0
Sediment								
360-37595-1	SD-SD1	OC-SD-SD1-0.0/0.5	11/11/2011	3				
360-37595-2	SD-SD2	OC-SD-SD2-0.0/0.5	11/11/2011	3				
360-37595-3	SD-SD3	OC-SD-SD3-0.0/0.5	11/11/2011	3				
360-37595-4	SD-SD3	OC-SD-SD3 DUP-0.0/0.5	11/11/2011	3				
360-37595-5	SD-SD4	OC-SD-SD4-0.0/0.5	11/11/2011	3				
360-37595-6	SD-SD5	OC-SD-SD5-0.0/0.5	11/11/2011	3				

Notes:

Number listed under method indicates number of target analytes reported.

Prepared by / Date: KJC 12/05/11 Checked by / Date: WDC 12/14/11

			Loc Name	GW-	10S	GW-2	201S	GW-2	201S	GW-2	202D	GW-2	02S	GW-	-24	GW	-25	GW	/-26
			Field Sample ID	OC-GV	V-10s	OC-GW	/-201S	OC-GW-2	01S-DUP	OC-GW	/-202D	OC-GW	-202S	OC-G	W-24	OC-G	W-25	OC-G	W-26
		F	ield Sample Date	11/11	/11	11/09	9/11	11/0	9/11	11/10	0/11	11/10	)/11	11/11	1/11	11/1	1/11	11/1	1/11
			QC Code	FS	3	F	3	F	D	F	S	FS	3	FS	S	F	3	F	s
	Lab Sample Delivery Gro		le Delivery Group	360-37	596-1	360-37	526-1	360-37	7526-1	360-37	552-1	360-37	552-1	360-37	596-1	360-37	596-1	360-3	7596-1
Fra	Method Analyte Units		Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result Qual		Result Qual		Result Qual	
F	SW6010	Aluminum	ug/l	3600		100 U		100	U	13000		100 l	IJ	100	U	100 U		100	U
F	SW6010	Chromium	ug/l	5 l	J	16		16		1000		4.8 J		5 U		2.4 J		6.1	
Ν	E300	Chloride	mg/l	20		77		81		260		45		13		110		330	
Ν	E300	Sulfate	mg/l	69		1400		1300		1700		330		53		96		32	
Ν	LACH_107_06_1_B	Nitrogen, as Ammonia	mg/l	4		180		150		300		60		36		36		47	
Ν	A2510B	LAB SPECIFIC CONDUCT	ANC umhos/cm	220		3100		3100		4400		1100		340		770		1200	

Notes:

N = normal

F = filtered

FS = field sample

FD = field duplicate

U = not detected, value is the detection limit

J = value is estimated

ug/l = microgram per liter

mg/l = milligram per liter

			Loc Name	GW-34	.D	GW-3	4SR	GW-	35S	GW-	42S	GW-4	3SR	GW-	76S	GW-	78S	GW-	-79S
			Field Sample ID	OC-GW-3	34D	OC-GW	'-34SR	OC-GV	N-35S	OC-GV	V-42S	OC-GW	-43SR	OC-GV	V-76s	OC-GV	V-78S	OC-G	W-79S
		F	ield Sample Date	11/10/1	11	11/10	0/11	11/09	9/11	11/1	0/11	11/10	)/11	11/1	1/11	11/0	9/11	11/0	9/11
			QC Code	FS		FS	3	FS	S	F	S	FS	3	FS	3	F	3	F	S
	Lab Sample Delivery Gro		le Delivery Group	360-3755	52-1	360-37	552-1	360-37	7526-1	360-37	′552-1	360-37	552-1	360-37	596-1	360-37	526-1	360-37526-1	
Fra	•		Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result Qual		Result Qual		Result	Qual
F	SW6010	Aluminum	ug/l	200 U		100 U		26 J		450		53 、	J	100	U	100 U		13	J
F	SW6010	Chromium	ug/l	15		1.4、	J	21		7.9		1.2 J		2.3 J		2.6 J		9	
Ν	E300	Chloride	mg/l	4.9		2.3		6.7		120		180		4.3		27		140	
Ν	E300	Sulfate	mg/l	60		7.9		200		12		32		38		450		1200	
Ν	LACH_107_06_1_B	Nitrogen, as Ammonia	mg/l	20		0.21		37		1		2.5		6.7		52		110	
Ν	A2510B	LAB SPECIFIC CONDUCT.	ANC umhos/cm	250		79		1000		500		730		150		1300		2800	

Notes:

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mg/l = milligram per liter

			Loc Name	GW-	CA1	PZ-16RR		PZ-1	7RR	PZ-18R		PZ-24		PZ-	25
			Field Sample ID	OC-GV	V-CA1	OC-PZ	-16RR	OC-PZ	-17RR	OC-PZ	'-18R	OC-P	Z-24	OC-P	Z-25
		F	ield Sample Date	11/10	0/11	11/0	9/11	11/09	9/11	11/09	9/11	11/10	)/11	11/10	)/11
			QC Code	F	S	FS		FS		FS	3	FS	3	FS	3
		Lab Samp	le Delivery Group	360-37	'552-1	360-37	7526-1	360-37	526-1	360-37	526-1	360-37	552-1	360-37	552-1
Frac	Method	Analyte	nalyte Units		Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
F	SW6010	Aluminum	ug/l	17 J		100 U		100	U	100	IJ	100 U		100 U	
F	SW6010	Chromium	ug/l	6.6		7.2		7.3		11		18		9.9	
N	E300	Chloride	mg/l	9.6		170		24		150		23		21	
N	E300	Sulfate	mg/l	93		1100		400		200		690		490	
N	LACH_107_06_1_B	Nitrogen, as Ammonia	mg/l	0.77		250		48		62		73		51	
N	A2510B	LAB SPECIFIC CONDUCT	ANCI umhos/cm	690		3000		1300		1200		2000		1400	

Prepared by / Date:

Checked by / Date:

KJC 12/09/11

WDC 12/14/11

Notes:

N = normal

F = filtered

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FD = field duplicate

U = not detected, value is the detection limit

J = value is estimated

ug/l = microgram per liter

mg/l = milligram per liter

			Loc Name	ISCO	)1	ISCO	)2	ISCO3		PZ-1	6RR	PZ-1	'RR	PZ-	I8R	PZ-1	8R	SD	-17
		Fie	eld Sample ID	OC-SW-I	SCO1	OC-SW-I	SCO2	OC-SW-ISC	03	OC-SW-	PZ16RR	OC-SW-F	Z17RR	OC-SW-	PZ18R	OC-SW-PZ	18R-DUP	OC-SW	/-SD17
		Field	Sample Date	11/08	/11	11/08	/11	11/08/11		11/0	8/11	11/08	3/11	11/0	3/11	11/08	3/11	11/0	8/11
			QC Code	FS		FS		FS		F	S	FS	3	F	3	FI	)	F	S
		Lab Sample Do	elivery Group	360-374	91-1	360-374	191-1	360-37491	1	360-37	'491-1	360-37	491-1	360-37	491-1	360-37	491-1	360-37	7491-1
Frac	Method	Analyte	Units	Result	Qual	Result	Qual	Result Q	ıal	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
F	SW6010	Aluminum	ug/l	150		130	130		28 J		69 J			170		180		1900	
F	SW6010	Chromium	ug/l	13		27		5 U		23		55		14		15		370	
F	SW6010	Sodium	ug/l	98000		100000 J		100000		130000	J	140000 .	J	96000		96000	J	140000	J
N	E300	Chloride	mg/l	120		97		170		120		130		120		120		130	
N	E300	Nitrate as N	mg/l	0.2		1.1		1	1			1.8		0.2		0.2		1.7	
N	A4500_NO2_B	Nitrite as N	mg/l	0.01 L	J	0.01 L	J	0.1 U		0.1 U		0.1 U		0.01 U		0.01 U		0.01 U	
N	E300	Sulfate	mg/l	110		180		33		160		180		120		110		190	
N	LACH_107_06_1_B	Nitrogen, as Ammonia	mg/l	25		33		1.7		31		33		30		29		32	
N	A2510B	LAB SPECIFIC CONDUCTANCE	umhos/cm	760				740		950		1000		780		780		1000	
Т	SW6010	Aluminum	ug/l	330		4000		200		1800		2000		270		260		2100	
Т	SW6010	Chromium	ug/l	30		750		2 J		380		470		22		21		470	
Т	SW6010	Sodium	ug/l	89000		84000 J		93000		110000	J	120000 .	J	88000		83000	J	120000	J

Prepared by / Date:

Checked by / Date: WDC 12/14/11

KJC 12/09/11

Notes: N = normal

T = total (unfiltered)

F = filtered

FS = field sample

FD = field duplicate

U = not detected, value is the detection limit

J = value is estimated

ug/l = microgram per liter

mg/l = milligram per liter

## Table 2 Final Results Summary

## November 2011 Slurry Wall / Cap Groundwater, Surface Water and Sediment Olin Chemical Superfund Site Wilmington, Massachusetts

			Loc Name	SD-S	SD1	SD-SD	SD-SD2		SD-SD3		SD3	SD-SD4		SD-S	D5
			Field Sample ID	OC-SD-SD	1-0.0/0.5	OC-SD-SD2-	-0.0/0.5	OC-SD-SD3 DUP-0.0/0.5		OC-SD-SD3-0.0/0.5		OC-SD-SD4-0.0/0.5		OC-SD-SD	5-0.0/0.5
			Field Sample Date	11/11	/11	11/11/1	1	11/11	/11	11/11	/11	11/1	1/11	11/11	/11
			QC Code	FS	3	FS		F	)	FS	3	F	S	FS	3
		I	Lab Sample Delivery Group	360-37	595-1	360-3759	95-1	360-37	595-1	360-37	595-1	360-37	595-1	360-37	595-1
Frac	Method	Analyte	Units	Result Qual		Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Т	SW6010	Aluminum	mg/kg	11000 J		11000 J		9800 、	l	9700	J	9900	J	11000 、	J
Т	SW6010	Chromium	mg/kg	30		130		45		35		140		59	
Т	SW6010	Iron	mg/kg	13000 、	J	14000 J		14000 J		14000 J		17000 J		15000 、	J
N	E160.3	Percent Moisture	percent	29		25		26		28		34		27	
N	E160.3	Percent Solids	percent	71		75		74		72		66		73	

Prepared by / Date:

Checked by / Date:

KJC 12/09/11

WDC 12/14/11

Notes:

N = normal

T = total (unfiltered)

FS = field sample

FD = field duplicate

J = value is estimated

mg/kg = milligram per kilogram

#### Table 3

### Validation Qualification Action Summary

#### **Data Validation Report**

### November 2011 Slurry Wall / Cap Groundwater, Surface Water and Sediment Olin Chemical Superfund Site

### Wilmington, Massachusetts

						Lab	Lab	Final	Final		
SDG	Lab Sample ID	Analytical Method	Fraction	Field Sample ID	Parameter	Result	Qualifier	Result	Qualifier	Val Reason Code	Units
360-37595-1	360-37595-1	SW6010	T	OC-SD-SD1-0.0/0.5	Aluminum	11000	В	11000	J	LCS-H	mg/kg
360-37595-1	360-37595-1	SW6010	Т	OC-SD-SD1-0.0/0.5	Iron	13000	В	13000	J	LCS-H	mg/kg
360-37595-1	360-37595-2	SW6010	Т	OC-SD-SD2-0.0/0.5	Aluminum	11000	В	11000	J	LCS-H	mg/kg
360-37595-1	360-37595-2	SW6010	Т	OC-SD-SD2-0.0/0.5	Iron	14000	В	14000	J	LCS-H	mg/kg
360-37595-1	360-37595-3	SW6010	Т	OC-SD-SD3-0.0/0.5	Aluminum	9700	В	9700	J	LCS-H	mg/kg
360-37595-1	360-37595-3	SW6010	Т	OC-SD-SD3-0.0/0.5	Iron	14000	В	14000	J	LCS-H	mg/kg
360-37595-1	360-37595-4	SW6010	Т	OC-SD-SD3 DUP-0.0/0.5	Aluminum	9800		9800	J	LCS-H	mg/kg
360-37595-1	360-37595-4	SW6010	Т	OC-SD-SD3 DUP-0.0/0.5	Iron	14000	В	14000	J	LCS-H	mg/kg
360-37595-1	360-37595-5	SW6010	Т	OC-SD-SD4-0.0/0.5	Aluminum	9900	В	9900	J	LCS-H	mg/kg
360-37595-1	360-37595-5	SW6010	Т	OC-SD-SD4-0.0/0.5	Iron	17000	В	17000	J	LCS-H	mg/kg
360-37595-1	360-37595-6	SW6010	Т	OC-SD-SD5-0.0/0.5	Aluminum	11000		11000	J	LCS-H	mg/kg
360-37595-1	360-37595-6	SW6010	Т	OC-SD-SD5-0.0/0.5	Iron	15000	В	15000	J	LCS-H	mg/kg
360-37491-1	360-37491-2	SW6010	D	OC-SW-ISCO2	Sodium	100000		100000	J	TD	ug/L
360-37491-1	360-37491-2	SW6010	Т	OC-SW-ISCO2	Sodium	84000		84000	J	TD	ug/L
360-37491-1	360-37491-4	SW6010	Т	OC-SW-PZ16RR	Sodium	110000		110000	J	TD	ug/L
360-37491-1	360-37491-4	SW6010	D	OC-SW-PZ16RR	Sodium	130000		130000	J	TD	ug/L
360-37491-1	360-37491-5	SW6010	D	OC-SW-PZ17RR	Sodium	140000		140000	J	TD	ug/L
360-37491-1	360-37491-5	SW6010	Т	OC-SW-PZ17RR	Sodium	120000		120000	J	TD	ug/L
360-37491-1	360-37491-7	SW6010	Т	OC-SW-SD17	Sodium	120000	В	120000	J	TD	ug/L
360-37491-1	360-37491-7	SW6010	D	OC-SW-SD17	Sodium	140000		140000	J	TD	ug/L
360-37491-1	360-37491-8	SW6010	D	OC-SW-PZ18R-DUP	Sodium	96000		96000	J	TD	ug/L
360-37491-1	360-37491-8	SW6010	Т	OC-SW-PZ18R-DUP	Sodium	83000	В	83000	J	TD	ug/L

Units:

ug/L = microgram per liter mg/kg = milligram per kilogram

Validation Qualifier:

J = Value is estimated

Validation Reason Codes:

LCS-H = LCS recovery high

TD = Dissolved concentration exceeds total

Prepared by / Date: KJC 12/09/11

Checked by / Date: WDC 12/14/11

Version 1.3, Oct 2011

## OLIN-WILMINGTON LEVEL I DATA QUALITY EVALUATION STANDARD OPERATING PROCEDURE AND CHECKLIST ICP METALS BY METHOD 6010B/200.7

Reviewer/Date Mullhullhe	12.1	12/1
Sr. Review/Date Chins Ricardi 1	14	112
Lab Report # 360 - 37526 -1	1	]
Project # 6107 110016,12		

displued aluminum + chromium	
1.0 <u>Laboratory Deliverable Requirements</u>	
1.1 Laboratory Information: Was all of the following provided in the laboratory report? Check items received.  Name of Laboratory  Name  Name  Name  Address  Address  Address  Client Information:  Name	
<b>ACTION</b> : If no, contact lab for submission of missing or illegible information.	
1.2 Laboratory Report Certification Statement	Yes [ ] No [ ] N/A [ ] Comments:
Does the laboratory report include a completed Analytical Report Certification in the required	format?
ACTION: If no, contact lab for submission of missing certification or certification with correct	
1.3 Laboratory Case Narrative:	Yes [ ] No [ ] N/A [ ] Comments:
Narrative serves as an exception report for the project and method QA/QC perform the	prmance.   ☐ Narrative includes an explanation of each discrepancy
	Certification Statement.
ACTION: If no, contact lab for submission of missing or illegible information.	
1.4 Chain of Custody (COC) copy present with all documentation completed	Yes No N/A Comments:
NOTE: Olin receives and maintains the original COC.	
ACTION: If no, contact lab for submission of copy of completed COC.	

1.5 Sample Receipt Information (Cooler Receipt Form present?):	Yes No N/A Comments:
Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?	
☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered ☑ Container type noted ☑ sample condition observed ☑ pH verified (where applicable) ☑ Field an	on the same day as collection, temperature requirement does not apply).
ACTION: If no, contact lab for submission of missing or incomplete documentation.	
<b>1.5.1</b> Were all samples delivered to the laboratory without breakage?	Yes No No N/A Comments:
1.5.2 Does the <i>Cooler Receipt Form</i> or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data?	Yes No No N/A Comments:
1.6 Sample Results Section: Was each of the following requirements supplied in the laboratory report for each sample?	Yes No NA Comments:
Clean-up method Analysis method Preparation method	Dilution Factor  moisture or solids  Reporting limit Date of preparation/extraction/digestion clean-up and analysis, where applicable its (soils must be reported in dry weight)
ACTION: If no, contact lab for submission of missing or incomplete information.	
<b>1.7 QA/QC Information:</b> Was each of the following information supplied in the laboratory report for each sample batch?	Yes No N/A Comments:

		/	1#		
Metl	nod blan	k results	eries  MS/MSD recoveries and RPDs  Laborator	y duplicate results (where applicable)	
ACTIO	N: If no	o, contact lab for submission	on of missing or incomplete information.		
2.0	Holdin	ng Times			
Have an	exceed	uical holding times, deter ed? Holding time for met and soil.	mined from date of collection to date of analysis, been tals is 180 days from sample collection to analysis for both	Yes [ ] No [ N/A ]	Comments:
NOTE:	List san	nples that exceed hold tim	e with # of days exceeded on checklist		
ACTIO	(UJ). I	echnical holding times are f grossly exceeded (2X ho	e exceeded, qualify all positive results (J) and non-detects olding time) reject (R) all non-detect results.		
	2.0001	atory Memou			
	3.1	Was the correct labor	ratory method used?	Yes No No N/A	Comments:
		Water Digestion Soil Digestion Metals	3005A or 3010A or 3020A 3050B 6010B or 200.7		
comp	ared to	the requested method st variance.	tory to provide justification for method change. Contact senior chemist to inform Client of change		
	3.2	Are the practical qua	antitation limits the same as those specified by the APP   Lab   MADEP	Yes [ No [ N/A [	Comments:
NOT	E: Verify	that the reported metals	match the target list specified on the COC.		

6010

	If no, evaluate variation with respect to sample matrix, preparation, dilution, tc. If sample PQL is indeterminate, contact lab for explanation.				
3.3	Are results present for each sample in the SDG?	Yes [	No []	N/A []	Comments:
ACTION: If n	no, check Request for Analysis to verify if method was ordered and COC to verify that it	/			- 1
3.4	If dilutions were required, were dilution factors reported?	Yes [_]	No []	N/A [_]	Comments:
ACTION: If r	no, contact the lab for submission.				
4.0 Metl	hod Blanks		/		
4.1	Is the Method Blank Summary present?	Yes []	No []	N/A []	Comments:
ACTION:	If no, call the laboratory for submission of missing data.		-		
4.2	Frequency of Analysis: Was a method blank analyzed for each digestion batch of < 20 field samples?	Yes [_]	No []	N/A []	Comments:
	If no, contact laboratory for justification. Consult senior chemist for action arrate non-compliance.				
4.3	Is the method blank less than the PQLs for all target elements?	Voc L	No F 1	N/A []	Comments:
NOTE: Mr samples	ADEP requires the method blank to be matrix matched and digested with the				
4.4 the fo	Do any method blanks have positive results for metals? Qualify data according to bllowing:	Yes []	No [	N/A [_]	Comments:

If the sample concentration is  $< 5 \times$  blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is  $> 5 \times$  blank value, no qualification is needed.

**ACTION:** For any blank with positive results, list all contaminants for each method blank including the concentration detected and the flagging level (flagging level = 5x the blank value) and the associated samples and qualifiers.

5.0	Labor	ratory Control Standard				
	5.1	Was a laboratory control standard run with each analytical batch of 20 samples or less?	Yes [_	No [_]	N/A [_]	Comments:
ACT	ION:	Ill target, second source LCS is required by MADEP. Call laboratory for LCS form submittal. If data are not available, use judgement to evaluate data accuracy associated with that batch.				
	5.2	Is a LCS Summary Form present?	Yes [_]	No [_]	N/A [_]	Comments:
ACT	ION:	If no, contact lab for resubmission of missing data.				
	5.3	Is the recovery of any analyte outside of MADEP control limits?  MADEP	Yes []	No [_]	N/A [_]	Comments:
	Water					
75 - 104-100	Soil	within Lab generated limits				
ACT	ION:	If recovery is above the upper limit, qualify all positive sample results				
		eatch as (J). If recovery is below the lower limit, qualify all positive and				
non-	detects	results within the batch as (J). If LCS recovery is <30% positive and non-				

Comments:

detect results are rejected (R).

### 6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

Were project-specific MS/MSDs collected? List project samples that were spiked.

ACTION: If no, contact senior chemist to see if any were specified.

6.2 Is the Matrix Spike/Matrix Spike Duplicate Recovery Form present?

NOTE: A <u>full</u> target, second source MS/MSD is required by MADEP.

**ACTION:** If any matrix spike data are missing, call lab for resubmission.

6.3 Were matrix spikes analyzed as indicated on the COC and project schedule?

**ACTION**: If any matrix spike data are missing, call lab for resubmission. If none, no qualification is needed. Narrate non-compliance.

6.4 Are any metal spike recoveries outside of the QC limits?

	MADEP	QAPP	
Sample Type	% Rec	% Rec	Method
Water	75-125	N/A	6010B
Water	N/A	70-130	200.7
Soil	75-125	75-125	6010B

NOTE: 
$$%R = (SSR-SR) \times 100\%$$
  
SA

Where: SSR = Spiked sample resultSR = Sample result

SA = Spike added

**NOTE:** If dilutions are required due to high sample concentrations (> 4X spike), the data are evaluated, but no flags are applied.

Yes [	No []	N/A [_]	Comments:
Yes [	No [_]	N/A []	Comments:
Yes 🗸	No [_]	N/A [_]	Comments:

Yes No No NA Comments:

OC-GW-2015

**NOTE:** If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.

**ACTION:** MS/MSD flags only apply to the sample spiked. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit, qualify positive results and non-detects (J).

6.5 Are any RPDs for MS/MSD recoveries outside of the QC limits?

Yes No No N/A Comments

NOTE: RPD = S-D x 100% (S+D)/2

Where: S = MS sample result D = MSD sample result

**NOTE:** If dilutions are required due to high sample concentrations, the data are evaluated, but no flags are applied.

**ACTION:** If the RPD exceeds the control limit, qualify positive results and non-detects (J).

### 7.0 <u>Laboratory Duplicate</u>

7.1 Was a laboratory duplicate sample analyzed? If so, is the Laboratory Yes [ ] No [ N/A [ ] Comments Duplicate Sample Form present?

NOTE: MADEP refers to this sample as a "matrix duplicate".

**ACTION:** If not analyzed, qualification is not needed. If data is missing, contact laboratory for resubmission of report. Narrate non-compliance.

7.2 Is the RPD between the result for the laboratory duplicate sample and the result for the parent sample outside of the QA/QC limits?

MADEP Laboratory Duplicate Sample RPD Criteria:	QAPP RPD
For aqueous results > $5 \times$ RL, RPD must be $\pm 20\%$	20
For aqueous results < 5× RL, RPD must be ≤ RL	20
For soil/sediment results > $5 \times$ RL, RPD must be $\pm 35\%$	20
For soil/sediment results $< 5 \times RL$ , RPD must be $\le 2 \times RL$	20

**ACTION**: If the RPD exceeds the limits, qualify both positive results and non-detects as estimated and flag them J. Narrate non-compliance

### 8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

- **8.1** Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist.
- **8.2** Do any rinsate blanks have positive results?

NOTE: MADEP does not require the collection of rinsate blanks.

**ACTION:** Evaluate rinsate results against blank results to determine if contaminant may be laboratory-derived. If results are not lab-related, qualify according to below.

If the sample concentration is  $< 5 \times$  blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is  $> 5 \times$  blank value, no qualification is needed.

### 9.0 Field Duplicates

**9.1** Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates.



Comments: OC-GW-2015

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9.2 Were field duplicates collected per the required frequency?  Yes [ No ] N/A [	Comments:			
SOW □ QAPP (1 per 10) □ MADEP Option 1 (1 per 20) □ MADEP Option 3 (1 per 10) □				
9.3 Was the RPD $\leq$ 50% for soils or waters? Calculate the RPD for all results and Yes $\square$ No $\square$ N/A [	[ ] Comments:		-1	
attach to this review.	OC-GW-2015	0216	DUP	RPD
CTION: PDD must be <500/ for soil and water Ovalify data (I) for 1 all 1 all 2011 PDD 1 500/	aluminum	1000	1004	0
CTION: RPD must be ≤50% for soil and water. Qualify data (J) for both sample results if the RPD exceeds 50%.	Chromium	16	16	0
0.0 Special QA/QC				
10.1 Were both total and dissolved metals analysis performed? If so, the Yes No No NA I dissolved metal concentration should not exceed that of the total metal.	Comments:			

**ACTION:** If results for both total and dissolved are  $\geq 5x$  the PQL and the dissolved concentration is 10% higher than the total, flag both results as estimated (J). If total and dissolved concentrations are less than 5x the PQL and the difference exceeds 2x the PQL, flag both results as estimated (J)

10.0	<b>Application</b>	of Validation	Qualifiers

Was any of the data qualified?

		,		
Yes [_	]	No [	N/A []	Comments

If so, apply data qualifiers directly to the DQE copy of laboratory report and flag pages for entry in database.

### REFERENCES

- LAW, 1999, "Final Quality Assurance Project Plan, Olin Wilmington Property, 51 Eames Street, Wilmington, MA", LAW Engineering and Environmental Services, Kennesaw, GA 30144. August 1999
- U.S. Environmental Protection Agency (USEPA), 1989. "Region 1 Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses"; Hazardous Site Evaluation Division; February 1989.
- MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Compendium of Quality Control Requirements and Performance Standards for Selected Analytical Protocols," WSC-CAM #10-320, Final, Revision No. 1, 1 July 2010.
- MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data in Support of Action Conducted Under the Massachusetts Contingency Plan (MCP)," WSC-CAM, Section VIIA, Final, Revision No. 1, 1 July 2010.
- MADEP, 2010. "Quality Control Requirements and Performance Standards for the Analysis of Trace Metals by Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES) in Support of Response Actions under the Massachusetts Contingency Plan (MCP)" WSC-CAM, Final, Revision No. 1, 5 July 2010.

Version 3, October 2008

### **OLIN-WILMINGTON** LEVEL I DATA QUALITY EVALUATION STANDARD OPERATING PROCEDURE AND CHECKLIST WET CHEMISTRY PARAMETERS BY VARIOUS METHODS

Reviewer/Date Muller		121.
Sr. Review/Date Chas Change	114	11/1
Lab Report # 360 - 3 7526 -1		1
Project # 6107 110016.12		

Note: The following analyses will be evaluated according to the "MADEP QA/QC Guidelines for Sampling, Data Evaluation and Reporting Activities." MADEP, however, may not list QA/QC criteria for every chemical analysis. Where not defined by MADEP, criteria will default to values stipulated in the QAPP. Where the QAPP does

	not define criteria, QA/QC requirements will default to limits employed by the laboratory.			
1.0	Laboratory Deliverable Requirements			
	1.1 Laboratory Information: Was all of the following provided in the laboratory report?  Check items received.		N/A [_]	Comments:
	☐ Name of Laboratory ☐ Address ☐ Project ID ☐ Phone #  Client Information: ☐ Name ☐ Address ☐ Client Contact	Sample identification	n – Field and	Laboratory
. OTTE	Client Information: Warme War Address Client Contact	(IDs must be cross-refer	renced)	
ACTIO	ON: If no, contact lab for submission of missing or illegible information.			
	1.2 Laboratory Report Certification Statement	Yes [ ] No [ ]	N/A []	Comments:
	Does the laboratory report include a completed Analytical Report Certification in the r	required format?		
ACTIO	N: If no, contact lab for submission of missing certification or certification with correct t	format.		
	1.3 Laboratory Case Narrative:	Yes [ ] No [ ]	N/A []	Comments:
	Narrative serves as an exception report for the project and method QA/QC performance.	. ☐ Narrative includ		ation of each discrepancy on the
ACTIO	N: If no, contact lab for submission of missing or illegible information.			
	1.4 Chain of Custody (COC) copy present with all documentation completed?	Yes No No	N/A []	Comments:
	Does the laboratory report include copies of Chain of Custody forms containing all samples in	n this SDG?		
	NOTE: Olin receives and maintains the original COC.			
ACTIO	N: If no, contact lab for submission of copy of missing completed COC.			

1.5 Sample Receipt Information (Cooler Receipt Form): Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

		/		
	Yes 💹	No [_]	N/A [_]	Comments:
☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered of	on the same d	lay as collect	tion, temperate	are requirement does not apply).
Container type noted Condition observed pH verified (where applicable) Field and lab II	Ds cross refe	renced		
ACTION: If no, contact lab for submission of missing or incomplete documentation.				
1.5.1 Were the correct bottles and preservatives used?		/ -		
√ Ammonia,—1 Liter polyethylene/H₂SO₄ to pH<2,cool to 4°C	Yes [_]	No [_]	N/A []	Comments:
Oil & Grease – 1 Liter glass/HCL or H2SO4 to pH<2,cool to 4°C				
Alkalinity – 1 Liter polyethylene/cool to 4°C				
Chemical Oxygen Demand – 50 mL polyethylene/H <sub>2</sub> SO <sub>4</sub> to pH<2,cool to 4°C				
Chloride, pH, sulfate, nitrate, nitrite - 50 mL polyethylene/cool to 4°C				
Nitrate/nitrite - H2SO4 to pH<2,cool to 4°C				
Organic Carbon – 500 mL amber glass bottle/HCl or H <sub>2</sub> SO <sub>4</sub> to pH<2,cool to 4°C				
Sulfide – 50 mL polyethylene/ZnAcetate + NaOH to pH>9, cool to 4°C				
Phenolics - H <sub>2</sub> SO <sub>4</sub> to pH<2,cool to 4°C				
Specific conductance, TDS, TSS – 100 mL polyethylene/cool to 4°C				
<b>ACTION:</b> If no, inform senior chemist. Document justification for change in container/volume (if applicable), qualify positive and non-detect data (J) data if cooler temperature exceeds 10°C. Rejection of data requires professional judgment				
1.5.2 Were all samples delivered to the laboratory without breakage?	Yes [	No [_]	N/A [_]	Comments:
1.5.3 Does the <i>Cooler Receipt Form</i> or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data?	Yes []	No [	N/A [_]	Comments:

1.6 Sa	imple Results Section: Was the port for each sample?	e following information supplied in the	,		
rop	ort for each sample:		Yes 🖸 No 📋	N/A [] Comments	:
Mield ID and	thod Analysis method		Dilution Factor Date of preparation/extraction	// moisture or solin/digestion clean-up and ana	ids  Reporting limit
☑ Matrix	☐ Target analytes ar	nd concentrations	Units (soils must be reported	in dry weight)	
ACTION: If no	o, contact lab for submission of mis	ssing or incomplete information.		, , ,	
1.7 QA for each	<b>QC Information:</b> Was the follow a sample batch?	wing information provided in the laborate	ory report Yes No No	N/A [_] Comments:	
				*	
Method blank	regults DICC	MS/MSD recoveries and RPDs			
Tyrethod blank	results LCS recoveries L	1 MS/MSD recoveries and RPDs DrL	aboratory duplicate results (where	applicable)	
ACTION: If no.	, contact lab for submission of mis	sing or incomplete information.			
2.0 Holding			Yes No No		
Have ar	ny technical holding times, detern	nined from date of collection to date of a	analysis, been exceeded? The hole	ding times are as follows:	
28	days = ammonia, chemical oxyg	gen demand, chloride, organic carbon, oi	il & grease, specific conductance	total organic carbon and gul	fata
A	lkalinity = 14 days	Sulfide, TDS, TSS = 7 days	pH = analyze immediately		
N	itrite nitrogen as N = 48 hrs	Nitrate + Nitrite as $N = 28$ days	pri analyze ininediately	Nitrate nitrogen as N	N = 48  nrs
		e with # of days exceeded on checklist			
judgment used to	qualify soils.	ed qualify results (J). For water samples	/		n-detect results. Professional
3.0	Laboratory Method		Yes No No	N/A [_] Comments:	
3.1 Was	the correct laboratory method use	ed?			
ACTION: If no,	contact lab to provide justification	for method change compared to the requ	ested method. Contact senior chem	nist to inform Client of change	ra or to request
		2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Contact Contact Contor Chen	not to mitorin chefit of chang	ge of to request variance.

WET CHEM

	3.2 Are the practical quantitation  ☐ QAPP/IRSWP ☐ Lab?	limits the same as those specified by	by the Yes No No N/A	Comments:
	therefore all criteria will default to values :	do not yet list PQLs for wet chemistry and stipulated in the QAPP*. Where the QAPP do ault to limits employed by the lab**. Other	nes not	
	Ammonia* ☑ = 0.1 mg/ L	Alkalinity** $\square = 1 \text{ mg/L}$	Bicarbonate Alkalinity** □ = 1 mg/L	Carbonate Alkalinity** □ = 1 mg/L
	Nitrate Nitrogen as $N* \square = .05 \text{ mg/L}$	Nitrite Nitrogen as N* $\square$ = .01 mg/L	Chloride* □ = 1 mg/L	Hardness $*\Box = 2 \text{ mg/L}$
	Spec. Cond.** 3 umhos/cm	Total Organic Carbon** □ = 1 mg/L	Oil & Grease* $\square = 5.5 \text{ mg/L}$	Sulfate (EPA 300.0)* $\mathbb{Z} = 2 \text{ mg/L}$
	COD:* Low – 20 mg/L	COD* High - 50 mg/L □	$TDS* \square = 10 \text{ mg/L}$	$TSS* \square = 5 \text{ mg/L}$
	$pH* \square < 2 \text{ to} > 12$	Phenolic - 0.01 mg/L		
	Other parameter(list)		Source of PQL =	
	Other parameter(list)	PQL= 🗆 S	Source of PQL =	
ACTIO	3.3 Are the appropriate parameter results ON: If no, check Request for Analysis to ver		Yes No No N/A System was sent, and contact lab for resubmissing	
	3.4 If dilutions were required, were dilution	n factors reported?	Yes No No N/A	Comments:
ACTIO	ON: If no, contact the lab for submission.			
4.0	Method Blanks		Yes [ No [ N/A [ ]	Comments:
	4.1 Are the Method Blank Summaries pre			
ACTIO	ON: If no, call the laboratory for submission	of missing data.		
	4.2 Was a method blank analyzed for eac 20 or less?	h analysis batch of wet chemistry field samp	les of Yes No No N/A	Comments:

WET CHEM

ACTIO	N: If no	, document discrepancy in case narrative and contact lab for justification. Consult seni	ior chemist f	or action nee	eded.	
	4.3 Is th	ne method blank less than the PQL? (See Section 3.2 for PQLs).	Yes 📝	No [_]	N/A []	Comments:
	4.4 Do accordi	any method blanks have positive results for wet chemistry parameters? Qualify data ng to the following:	Yes []	No [_]	N/A [_]	Comments:
	If the sa PQL or	ample concentration is $< 5 \times$ blank value, flag sample result non-detect "U" at the the concentration reported if greater than the PQL.				
	If the sa	ample concentration is $> 5 \times$ blank value, no qualification is needed.				
ACTIC Jualifier	ON: If an	ny blank has positive results, list all the concentrations detected and flagging level (fla	agging level	= 5 × blank	value) on the c	checklist. List all affected samples and their
5.0	Labora	atory Control Standards				
	5.1	Was a laboratory control standard (LCS) run with each analytical batch of 20 samples or less?	Yes 🗾	No [_]	N/A []	Comments:
ACTIO udgmer	N: If no	o, call laboratory for LCS form submittal. If data is not available, use professional rmine qualification actions for data associated with the batch.		/		
	5.2	Is a LCS Summary Form present?	Yes [1]	No [_]	N/A []	Comments:
CTIO	N: If no	, contact lab for resubmission of missing data.				
	5.3	Is any wet chemistry analyte LCS recovery outside the control limits?	Yes []	No 🗾	N/A [_]	Comments:

WET CHEM

### LCS Limits:

	Alkalinity** $\square = 80-120\%$ Total Organic Carbon** $\square = 80-120\%$ COD Low* $\square = 80-120\%$ Hardness* $\square = 80-120\%$	Bicarbonate Alkalinity** $\square = 80-120\%$ TDS** $\square = 80-120\%$ COD High* $\square = 80-120\%$ Chloride* $\square = 80-120\%$	Carbonate Alkalinity** □ Oil & Grease* □ = 80- Nitrate Nitrogen as N Sulfate (EPA 300.0)* □	120% **□ = 80-120%	Specific Conductivity * Ammonia Nitrogen as Nitrite Nitrogen as N pH* □ = 98-102%	N* 🗷 = 80-120%
	Other parameter(list)	%R =		Rec Limits=		
		%R =			,	
		(MADEP has not yet defined LCS reco				
6.0 Matri	Matrix Spikes  x spikes may be collected at different for schedules. Confirm spike requirements	frequencies based on monthly, quarterly ents for each set with the senior chemist	, or task			
		s analyzed? List project samples that were s	piked.		Comments: OC-	
ACTI	ON: If no, contact senior chemist to see if		Yes No	N/A	Comments: OC-	GW-2015
ACTI	6.2 Is the MS/MSD Recovery Form ON: If no, contact lab for resubmission of		Yes No	N/A	Comments:	
	matrix?  ON: If any matrix spike data is missing, ca		Yes No		Comments:	
MS unspil	for amnonia (134) in sayle tel amnonia result is greater to freeten required.	oc-GW-2015 exceeded the y them four times the spiking &	you altered of 125. Concertation Yes [ No	N/A	Comments:	
e ms	D for sulfate (47) was be	s than the lower QC Grit of 7	-5; no feel treation	was require	<i>V</i> .	
	CHEM	Page 6				

Client: Olin Corporation

Project/Site: Olin Chemical Semiannual

Lab Sample ID: MB 360-83987/5

Method: 300.0 - Chloride & Sulfate (Continued)

Client Sample ID: Method Blank

Prep Type: Total/NA

Analysis Batch: 83987

Analysis Batch: 84080

Analysis Batch: 84209

Matrix: Water

	IIID	IVID							
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	ND	×	2.0	2.0	mg/L			11/24/11 09:00	1
Chloride	ND	/	1.0	1.0	mg/L			11/24/11 09:00	1

Lab Sample ID: LCS 360-83987/6

Matrix: Water

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Matrix: Water Prep Type: Total/NA
Analysis Batch: 83987

Spike LCS LCS %Rec. Analyte Added Qualifier Result Unit D %Rec Limits Sulfate 80.0 86.5 mg/L 108 85 - 115 Chloride 40.0 43.9 mg/L 110 85 - 115

Lab Sample ID: MB 360-84080/3

Matrix: Water

Client Sample ID: Method Blank
Prep Type: Total/NA

Analysis Batch: 84080

Analyte Result Qualifier RL RL Unit D Prepared Analyzed Dil Fac Sulfate ND 2.0 2.0 mg/L 11/28/11 20:17 Chloride ND 1.0 1.0 mg/L 11/28/11 20:17

Lab Sample ID: LCS 360-84080/4 Client Sample ID: Lab Control Sample

Matrix: Water Prep Type: Total/NA

Spike LCS LCS %Rec.

Analyte Added Result Qualifier Unit D %Rec Limits

 Sulfate
 80.0
 77.4
 mg/L
 97
 85 - 115

 Chloride
 40.0
 39.8
 mg/L
 99
 85 - 115

Lab Sample ID: 360-37526-3 MS

Client Sample ID: OC-GW-201S

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 84080

Sample Sample Spike MS MS %Rec.

Analyte Result Qualifier Added Result Qualifier Unit D %Rec Limits

 Analyte
 Result
 Qualifier
 Added
 Result
 Qualifier
 Unit
 D
 %Rec
 Limits

 Sulfate
 1400
 400
 1770
 mg/L
 92
 75 - 125

Lab Sample ID: 360-37526-3 MSD

Matrix: Water

Client Sample ID: OC-GW-201S

Prep Type: Total/NA

Analysis Batch: 84080

Sample Sample Spike MSD MSD %Rec. RPD %Rec Analyte Result Qualifier Added Qualifier D Result Limits Unit RPD Limit Sulfate 1400 400 1590 mg/L 75 - 125

Lab Sample ID: MB 360-84209/5

Matrix: Water

Client Sample ID: Method Blank
Prep Type: Total/NA

MB MB

Analyte Result Qualifier RL RL Unit D Prepared Analyzed Dil Fac

 Sulfate
 ND
 2.0
 2.0 mg/L
 12/01/11 16:00
 1

 Chloride
 ND
 1.0 mg/L
 12/01/11 16:00
 1

Client Sample ID: Method Blank

Prep Type: Total/NA

Client: Olin Corporation

Project/Site: Olin Chemical Semiannual

Method: 300.0 - Chloride & Sulfate (Continued)

Lab Sample ID: LCS 360-84209/6 Matrix: Water					Client	Sample I	D: Lab Control Sample Prep Type: Total/NA
Analysis Batch: 84209							
	Spike	LCS	LCS				%Rec.
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits
Sulfate	80.0	78.5		mg/L		98	85 - 115
Chloride	40.0	41.4		mg/L		103	85 - 115

### Method: L107-06-1B - Nitrogen Ammonia

Lab Sample ID: MB 360-83754/1-A

Lab Sample ID: MB 360-83810/1-A

Matrix: Water

Analysis Batch: 83912								Prep Batch	: 83754
	MB	MB							
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	ND	/	0.10	0.10	mg/L		11/22/11 11:45	11/23/11 14:05	1
	9								
Lab Sample ID: LCS 360-83754/2-A						C	lient Sample I	D. Lab Control	Sample

Matrix: Water Analysis Batch: 83912								pe: Total/NA Batch: 83754
	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Ammonia	10.0	9.28		mg/L		93	90 - 110	

								/			
Lab Sample ID: 360-37526-3 MS								Client S	ample ID:	OC-GW	-201S
Matrix: Water									Prep Ty	pe: To	tal/NA
Analysis Batch: 83912									Prep	Batch:	83754
	Sample	Sample	Spike	MS	MS		,		%Rec.		
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	ď	%Rec	Limits		
Ammonia	180	V	10.0	192	4	mg/L		134	90 - 110		
Lab Sample ID: 360-37526-3 MSD							la in a f	Client S	ample ID:	OC-GW	-201S
Matrix: Water									Prep Ty	pe: To	tal/NA
Analysis Batch: 83912									Prep	Batch:	83754
	Sample	Sample	Spike	MSD	MSD				%Rec.		RPD
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Ammonia	180		10.0	188	4	mg/L		97	90 - 110	2	20

Matrix: Water Analysis Batch: 83913										Prep Type: Prep Bato	
Analyte		MB Qualifier		RL	RL	. Unit		D	Prepared	Analyzed	Dil Fac
Ammonia	ND	/	C	).10	0.10	mg/L			/23/11 09:1	Total Comment of the	1
Lab Sample ID: LCS 360-83810/2-A	·							Clie	nt Sample	ID: Lab Contro	l Sample
Matrix: Water										Prep Type:	Total/NA
Analysis Batch: 83913										Prep Batc	h: 83810
			Spike		LCS L	cs				%Rec.	
Analyte			Added	F	Result Q	ualifier	Unit		D %Rec	Limits	
Ammonia			10.0		10.4		ma/L		104	90 - 110	

Client Sample ID: Method Blank

Client: Olin Corporation

Project/Site: Olin Chemical Semiannual

Method: L107-06-1B - Nitrogen Ammonia (Continued)

Lab Sample ID: 360-37526-8 MS Client Sample ID: OC-PZ-18R Matrix: Water Prep Type: Total/NA Analysis Batch: 83913 Prep Batch: 83810

Spike MS MS Sample Sample %Rec. Result Qualifier Analyte Result Qualifier Added Unit D %Rec Limits Ammonia 62 10.0 71.2 4 mg/L 90 - 110 93

Lab Sample ID: 360-37526-8 MSD

Matrix: Water

Analysis Batch: 83913

Analyte Ammonia 62

Sample Sample Spike Result Qualifier

Added 10.0

MSD MSD Result Qualifier 74.0 4

Unit mg/L

Prep Batch: 83810 %Rec Limits 90 - 110 121

RPD RPD Limit 20

Prep Type: Total/NA

Prep Type: Total/NA

Client Sample ID: OC-PZ-18R

Method: SM 2510B - Conductivity, Specific Conductance

Lab Sample ID: MB 360-83283/3 Matrix: Water

MB MB

Analysis Batch: 83283

Analyte Specific Conductance

Result ND

Qualifier RL 1.0

RL Unit 1.0 umhos/cm Prepared

Dil Fac Analyzed 11/12/11 09:43

Client Sample ID: Method Blank

Lab Sample ID: LCS 360-83283/1 Client Sample ID: Lab Control Sample Matrix: Water Prep Type: Total/NA

Analysis Batch: 83283

Specific Conductance

Spike Added 1410

LCS LCS Result Qualifier 1410

Unit umhos/cm

%Rec. D %Rec Limits 100 85 - 115

> Client Sample ID: Method Blank Prep Type: Total/NA

Lab Sample ID: MB 360-83626/3

Matrix: Water

Analysis Batch: 83626

Analyte

Specific Conductance

MB Result Qualifier ND

MB

RI 1.0 RL Unit 1.0 umhos/cm D

Prepared Analyzed 11/19/11 08:19

Client Sample ID: Lab Control Sample

85 - 115

Client Sample ID: OC-GW-201S

Dil Fac

Lab Sample ID: LCS 360-83626/1

Matrix: Water

Analysis Batch: 83626

Analyte Specific Conductance

Spike Added

1410

LCS LCS Result Qualifier 1400

Unit umhos/cm %Rec

%Rec. Limits

Prep Type: Total/NA

Lab Sample ID: 360-37526-3 DU

Matrix: Water

Analysis Batch: 83626

Sample Sample 3100 Specific Conductance

Result Qualifier

DU DU Result Qualifier 3120

Unit umhos/cm Prep Type: Total/NA RPD

> RPD Limit 20 0.3

### **OLIN-WILMINGTON** LEVEL I DATA QUALITY EVALUATION

### STANDARD OPERATING PROCEDURE AND CHECKLIST WET CHEMISTRY PARAMETERS BY VARIOUS METHODS

SA	SA = Spike added	Whe	ere: SSR =	Spiked sample SR = Sample
MS/MSD Recovery Limits:				
Alkalinity* = NA	Bicarbonate Alkalinity* = NA	Carbonate alkalinity* = NA	Ammonia* (LACH	AT) 🚉= 75-125%
Alkalinity* = NA Chloride*(SM 4500 Cl) 🗷 = 75-125%	Specific Conductivity $* = NA$	Total Organic Carbon* = NA		
Oil & Grease* = NA	COD Low* $\Box = 75-125\%$	COD High* $\Box = 75-125\%$	Nitrate Nitrogen as	N** □ = 75-125%
Nitrite Nitrogen as N** $\square = 75-125\%$	Hardness* $\square = 75-125\%$	Sulfate (EPA 300.0)* = 75-125%		
		, , , , , , , , , , , , , , , , , , , ,	o pii ivi	100 - 111
NOTES: 1) If only one of the recoveries: 2) If the MS/MSD was performed and the sample of the sample positive results as estimated (J). If the recoveries is the sample positive results as estimated (J).	% R =  Olin QAPP Limits (MADEP has not for an MS/MSD pair is outside of the co ed by the laboratory on a non-project san e spiked. Do not evaluate if sample con overies of the MS and MSD are lower to	Description of the properties	mits =  r wet chemistry analy  ry. Use professional ju  ries of the MS and MS	dgment for the MS/MSI
* = Laboratory Limits	% R = Olin QAPP Limits (MADEP has not for an MS/MSD pair is outside of the cond by the laboratory on a non-project same espiked. Do not evaluate if sample converies of the MS and MSD are lower to detect, the results are considered unusary	Description of the property o	mits =  r wet chemistry analy  ry. Use professional ju  ries of the MS and MSI  qualify both positive r	dgment for the MS/MSE  D exceed the upper contresults and non-detects (J
* = Laboratory Limits	% R = Olin QAPP Limits (MADEP has not for an MS/MSD pair is outside of the cond by the laboratory on a non-project same espiked. Do not evaluate if sample converies of the MS and MSD are lower to detect, the results are considered unusately spiked sample results fall within the not	Description of the property o	mits =  r wet chemistry analy  ry. Use professional ju  ries of the MS and MSI  qualify both positive required due to high sa	dgment for the MS/MSD D exceed the upper contresults and non-detects (J
* = Laboratory Limits	% R = Olin QAPP Limits (MADEP has not for an MS/MSD pair is outside of the cond by the laboratory on a non-project same spiked. Do not evaluate if sample converies of the MS and MSD are lower to detect, the results are considered unusately spiked sample results fall within the not so outside of the QA/QC limits?	Description of yet defined LCS recovery limits for control limits, no qualification is necessary imple, no qualification is required. In the recovery than the lower control limit but > 30%, ble and flagged (R).  The recovery limits for the recovery in t	mits =  r wet chemistry analy  ry. Use professional ju  ries of the MS and MSI  qualify both positive r	dgment for the MS/MSE  D exceed the upper contresults and non-detects (Jample concentrations, the
* = Laboratory Limits	% R = Olin QAPP Limits (MADEP has not for an MS/MSD pair is outside of the cold by the laboratory on a non-project same spiked. Do not evaluate if sample converies of the MS and MSD are lower to detect, the results are considered unusately spiked sample results fall within the not so outside of the QA/QC limits? There S = MS result	Description of the property o	mits =  r wet chemistry analy  ry. Use professional ju  ries of the MS and MSI  qualify both positive required due to high sa	dgment for the MS/MSDD exceed the upper contresults and non-detects (Jample concentrations, the

WET CHEM

Comments:

Are the RPDs for the laboratory duplicates <20% unless otherwise specified below?

ACTI	ON: If the RPD is greate	er than specified limits, qualify all results for tha	t analyte as estimated (J	).			-1 - 4 - 1		
	pH* □ = 3%	Specific Conductivity *□ = 5%	TSS** □ = 6%			TDS** □ = 6	%		
8.0	Sampling Accuracy			e .					
The n	najority of ground wate	er samples are collected directly from a tag se blanks will not be collected.	o, process stream, or						
	8.1 Were rinsate blan associated samples fro	ks collected? Prior to evaluating rinsate blan om the senior chemist.	ks, obtain a list of the	Yes []	No 🗾	N/A []	Comments:		
	8.2 Do any rinsate blan	nks have positive results?		Yes []	No [_]	N/A [_]	Comments:		
ACT	If the sample concentr	results vs. blank results to determine if conration is $< 5 \times$ blank value, flag sample result no ration is $> 5 \times$ blank value, no qualification is no	on-detect "U" at the PQI						low.
NOTE	: MADEP does not red	quire the collection of rinsate blanks.							
9.0	Field Duplicates  9.1 Were field duplicates.	licate samples collected? Obtain a list of samp	les and their associated	Yes 📝	No [_]	N/A []	Comments:	00-60-20	IS
Q.		ates collected per the required frequency?  EP Option 1(1 per 20)   MADEP Optio	n 3 (1 per 10) 🏻	Yes [	No [_]	N/A []	Comments:		
	9.3 Was the RPD ≤ 30 attach to this review	0% for waters $\leq$ 50% for soils? Calculate the v.	RPD for results and	Yes [V]	No [_]	N/A []	Comments:	Sel atta	led.

#### VALIDATION REPORT 360-37526-1 WET CHEM FIELD DUPLICATE RPD ASSESSMENT NOVEMBER 2011 OLIN SLURRY WALL CAP

Sample ID	Analyte	Orig	Q	DUP	Q	RPD
OC-GW-201S	Chloride	7	7	8		5.1
OC-GW-201S	LAB SPECIFIC CONDUCTANCE	310	0	3100	)	0
OC-GW-201S	Nitrogen, as Ammonia	18	180 150		)	18
OC-GW-201S	Sulfate	140	0	1300	)	7.4

Mounth

ACTION:. Qualify data (J) for both sample results if the RPD exceeded.

Was any of the data qualified?

Yes No N/A Comments:

If so, apply data qualifiers directly to the DQE copy of laboratory report and flag pages for entry in database.

#### REFERENCES:-

MACTEC, 2007. "Draft Interim Response Steps Work Plan"; Olin Chemical Superfund Site, 51 Eames Street, Wilmington, Massachusetts.; Project No. 6300-06-0010/41.1; July 25, 2007.

MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Compendium of Quality Control Requirements and Performance Standards for Selected Analytical Protocols," WSC-CAM #10-320, Final, Revision No. 1, 5 July 2010.

MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data in Support of Action Conducted Under the Massachusetts Contingency Plan (MCP)," WSC-CAM, Section VIIA, Final, Revision No. 1, 1 July 2010.

Version 1.3, Oct 2011

#### OLIN-WILMINGTON LEVEL I DATA QUALITY EVALUATION STANDARD OPERATING PROCEDURE AND CHECKLIST ICP METALS BY METHOD 6010B/200 7

Reviewer/Date Mullell 12	17	14
Sr. Review/Date Chris (Greard)	14	12
Lab Report # 360 - 37551-1	1'	-
Project # 6107 110016,12		

	icr i	METALS BY METHOD 6010B/20	00.7	Project #	6107 110016,	12
dissi	olved aluminum, chromium.					180
1.0	<u>Laboratory Deliverable Requirements</u>					
	1.1 Laboratory Information: Was all of the following process the control of the following process to the following proces		9		Comments:  Id Laboratory  Inced)	
ACTIO	ON: If no, contact lab for submission of missing or il	llegible information.				
	1.2 Laboratory Report Certification Statement		Yes [ ] No [		Comments:	
Does th	ne laboratory report include a completed Analytical Re	eport Certification in the required	format?		i.	
ACTIO	N: If no, contact lab for submission of missing certific	ation or certification with correct	format.			
	1.3 Laboratory Case Narrative:		Yes [ No [		Comments:	
	Narrative serves as an exception report for the ponthe	project and method QA/QC perfo	ormance.	7 Narrative include	es an explanation (	of each discrepancy
				Certificat	ion Statement.	
ACTIO.	N: If no, contact lab for submission of missing or illeg	ible information.	/	ğ.		
	1.4 Chain of Custody (COC) copy present with all doc	cumentation completed	Yes No [		Comments:	
	NOTE: Olin receives and maintains the original COC.					
ACTIO	N: If no, contact lab for submission of copy of completed	COC.				

							THE REAL PROPERTY AND ADDRESS OF THE PARTY AND	THE RESERVE OF THE PARTY OF THE	SHAPE THE PERSON NAMED IN COLUMN TWO IS NOT THE OWNER.	
1.5	5 Sample l	Receipt Infor	mation (Cooler F	Receipt Form	present?):		Yes 1	No[]	N/A [ ]	Comments:
W	ere each of to the labora	f the followin atory?	g tasks completed	and recorded	upon receipt of the sam	mple(s)		-10		Commons.
☐ Sample t	emperature er type noted	confirmed: n	nust be 1° – 10° C.	(If samples wer	e sent by courier and de	elivered o	on the same	day as colle	ction, tempera	ture requirement does not apply).
ACTION:	If no, conta	act lab for sub	mission of missing	or incomplete	documentation.					
	1.5.1	Were all sar	mples delivered to t	he laboratory w	vithout breakage?		Yes 🗾	No []	N/A [_]	Comments:
	1.5.2	Circumstanc	es affecting the qua	iity of the data						Comments:
1.0	Sample laborator	Results Sectory report for ea	tion: Was each of ach sample?	the following	requirements supplied	in the	Yes [_]	No []	N/A []	Comments:
☑ Wield II ☑ Clean-u ☑ Matrix	D and Lab	ID Z	Date and time coll Analysis method rget analytes and co	ected oncentrations	Applyst Initials  Description Preparation methods	ood Unit	Dilution Date of page (soils must	Factor preparation/e t be reported	extraction/dige	moisture or solids Reporting linestion clean-up and analysis, where applicat
			omission of missing				/			
1.7 lab	7 QA/QC poratory rep	Information port for each s	: Was each of ample batch?	he following	information supplied	in the	Yes [_]	No []	N/A []	Comments:

Method blank results	
ACTION: If no, contact lab for submission of missing or incomplete information.	
2.0 <u>Holding Times</u>	
Have any technical holding times, determined from date of collection to date of analysis, been Yes No N/A Comment exceeded? Holding time for metals is 180 days from sample collection to analysis for both water and soil.	s:
NOTE: List samples that exceed hold time with # of days exceeded on checklist	
ACTION: If technical holding times are exceeded, qualify all positive results (J) and non-detects (UJ). If grossly exceeded (2X holding time) reject (R) all non-detect results.	
3.0 <u>Laboratory Method</u>	
3.1 Was the correct laboratory method used?  Yes [ No [ N/A [ Commen	ıts:
Water Digestion 3005A or 3010A or 3020A Soil Digestion 3050B Metals 6010B or 200.7	
ACTION: If no, contact laboratory to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change and to request variance.	
Are the practical quantitation limits the same as those specified by the Yes [_] No [_] N/A [_] Commen	ıts:
NOTE: Verify that the reported metals match the target list specified on the COC.	

6010

ACT mois	TON: ture, et	If no, evaluate variation with respect to sample matrix, preparation, dilution, c. If sample PQL is indeterminate, contact lab for explanation.				
	3.3	Are results present for each sample in the SDG?	Yes []	No []	N/A []	Comments:
ACTIC	N: If no	o, check Request for Analysis to verify if method was ordered and COC to verify that it	1			
	3.4	If dilutions were required, were dilution factors reported?	Yes [_]	No []	N/A []	Comments:
ACTIC	N: If n	o, contact the lab for submission.				
4.0	Meth	od Blanks				
	4.1	Is the Method Blank Summary present?	Yes [	No []	N/A []	Comments:
ACT	TON:	If no, call the laboratory for submission of missing data.		_		
	4.2	Frequency of Analysis: Was a method blank analyzed for each digestion batch of < 20 field samples?	Yes [	No [_]	N/A []	Comments:
		If no, contact laboratory for justification. Consult senior chemist for action rate non-compliance.				
	4.3	Is the method blank less than the PQLs for all target elements?	Voc.1	No.F. 1	NI/A F 3	Comments:
NOT samp	E: MA bles	DEP requires the method blank to be matrix matched and digested with the	1 es [ <u>/</u> ]	140	N/A	Comments:
	4.4 the fol	Do any method blanks have positive results for metals? Qualify data according to llowing:	Yes [_]	No [	N/A []	Comments:

If the sample concentration is $< 5 \times$ blank value,	, flag sample result non-detect "U" at the
PQL or the concentration reported if greater that	n the PQL.

If the sample concentration is  $> 5 \times$  blank value, no qualification is needed.

**ACTION:** For any blank with positive results, list all contaminants for each method blank including the concentration detected and the flagging level (flagging level = 5x the blank value) and the associated samples and qualifiers.

5.0	Labor	atory Control Standard				
	5.1	Was a laboratory control standard run with each analytical batch of 20 samples or less?	Yes 🗾	No [_]	N/A [_]	Comments:
ACT	ION:	It target, second source LCS is required by MADEP. Call laboratory for LCS form submittal. If data are not available, use judgement to evaluate data accuracy associated with that batch.	,			
	5.2	Is a LCS Summary Form present?	Yes []	No [_]	N/A []	Comments:
ACT	ION: I	f no, contact lab for resubmission of missing data.				
	5.3	Is the recovery of any analyte outside of MADEP control limits?  MADEP	Yes []	No [/	N/A [_]	Comments:
		e Type % Rec				
	Water					
	Soil	within Lab generated limits				
ACI	ION:	If recovery is above the upper limit, qualify all positive sample results				
with	in the b	atch as (J). If recovery is below the lower limit, qualify all positive and				
non-	detects 1	results within the batch as (J). If LCS recovery is <30%, positive and non-				
		s are rejected (R).				

Comments:

#### 6.0 **Matrix Spikes**

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

Were project-specific MS/MSDs collected? List project samples that were 6.1

ACTION: If no, contact senior chemist to see if any were specified.

6.2 Is the Matrix Spike/Matrix Spike Duplicate Recovery Form present?

NOTE: A full target, second source MS/MSD is required by MADEP.

ACTION: If any matrix spike data are missing, call lab for resubmission.

Were matrix spikes analyzed as indicated on the COC and project 6.3 schedule?

Yes No No NA NA

ACTION: If any matrix spike data are missing, call lab for resubmission. If none, no qualification is needed. Narrate non-compliance.

6.4 Are any metal spike recoveries outside of the QC limits?

	MADEP	QAPP	
Sample Type	% Rec	% Rec	Method
Water	75-125	N/A	6010B
Water	N/A	70-130	200.7
Soil	75-125	75-125	6010B

**NOTE**:  $%R = (SSR-SR) \times 100\%$ SA

Where: SSR = Spiked sample result SR = Sample result

SA = Spike added

NOTE: If dilutions are required due to high sample concentrations (> 4X spike), the data are evaluated, but no flags are applied.

NOTE: If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.				
<b>ACTION:</b> MS/MSD flags only apply to the sample spiked. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit, qualify positive results and non-detects (J).				
6.5 Are any RPDs for MS/MSD recoveries outside of the QC limits?	Yes []	No [	N/A [_]	Comments:
NOTE: RPD = S-D x 100% Where: $S = MS$ sample result $D = MSD$ sample result				
<b>NOTE:</b> If dilutions are required due to high sample concentrations, the data are evaluated, but no flags are applied.				
<b>ACTION:</b> If the RPD exceeds the control limit, qualify positive results and non-detects (J).				
7.0 <u>Laboratory Duplicate</u>				
<b>7.1</b> Was a laboratory duplicate sample analyzed? If so, is the Laboratory Duplicate Sample Form present?	Yes [	No [_]	N/A []	Comments:
NOTE: MADEP refers to this sample as a "matrix duplicate".				
ACTION: If not analyzed, qualification is not needed. If data is missing, contact laboratory for resubmission of report. Narrate non-compliance.				
7.2 Is the RPD between the result for the laboratory duplicate sample and the result for the parent sample outside of the OA/OC limits?	Yes []	No 🗾	N/A []	Comments:

6010

MADEP Laboratory Duplicate Sample RPD Criteria:	QAPP RPD
For aqueous results > $5 \times$ RL, RPD must be $\pm 20\%$	20
For aqueous results $< 5 \times RL$ , RPD must be $\leq RL$	20
For soil/sediment results > $5 \times$ RL, RPD must be $\pm 35\%$	20
For soil/sediment results $< 5 \times RL$ , RPD must be $\le 2 \times RL$	20

**ACTION**: If the RPD exceeds the limits, qualify both positive results and non-detects as estimated and flag them J. Narrate non-compliance

#### 8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

- 8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist.
  8.2 Do any rinsate blanks have positive results?
- NOTE: MADEP does not require the collection of rinsate blanks.

**ACTION:** Evaluate rinsate results against blank results to determine if contaminant may be laboratory-derived. If results are not lab-related, qualify according to below.

If the sample concentration is  $< 5 \times$  blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is  $> 5 \times$  blank value, no qualification is needed.

#### 9.0 Field Duplicates

**9.1** Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates.

Yes No N/A Comments

9.2 Were field duplicates collected per the required frequency?	Yes []	No []	N/A	Comments:
SOW □ QAPP (1 per 10) □ MADEP Option 1 (1 per 20) □ MADEP Option 3 (1 per 10) □			,	<i>c</i>
9.3 Was the RPD $\leq$ 50% for soils or waters? Calculate the RPD for all results and attach to this review.	Yes []	No []	N/A	Comments:
<b>ACTION</b> : RPD must be ≤50% for soil and water. Qualify data (J) for both sample results if	the RPD e	xceeds 50%	√₀.	
10.0 Special QA/QC		,		
10.1 Were both total and dissolved metals analysis performed? If so, the dissolved metal concentration should not exceed that of the total metal.	Yes []	No M	N/A []	Comments:
<b>ACTION:</b> If results for both total and dissolved are $\geq 5x$ the PQL and the dissolved concentration is 10% higher than the total, flag both results as estimated (J). If total and dissolved concentrations are less than $5x$ the PQL and the difference exceeds $2x$ the PQL, flag both results as estimated (J)				

10.0	<b>Application</b>	of Validation	Qualifiers
10.0	Application	or validation	Qualifiers

Was any of the data qualified?

	/	/	
Yes []	No [_]	N/A []	Comments:

If so, apply data qualifiers directly to the DQE copy of laboratory report and flag pages for entry in database.

#### REFERENCES

- LAW, 1999, "Final Quality Assurance Project Plan, Olin Wilmington Property, 51 Eames Street, Wilmington, MA", LAW Engineering and Environmental Services, Kennesaw, GA 30144. August 1999
- U.S. Environmental Protection Agency (USEPA), 1989. "Region 1 Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses"; Hazardous Site Evaluation Division; February 1989.
- MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Compendium of Quality Control Requirements and Performance Standards for Selected Analytical Protocols," WSC-CAM #10-320, Final, Revision No. 1, 1 July 2010.
- MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data in Support of Action Conducted Under the Massachusetts Contingency Plan (MCP)," WSC-CAM, Section VIIA, Final, Revision No. 1, 1 July 2010.
- MADEP, 2010. "Quality Control Requirements and Performance Standards for the Analysis of Trace Metals by Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES) in Support of Response Actions under the Massachusetts Contingency Plan (MCP)" WSC-CAM, Final, Revision No. 1, 5 July 2010.

Version 3, October 2008

#### OLIN-WILMINGTON LEVEL I DATA QUALITY EVALUATION STANDARD OPERATING PROCEDURE AND CHECKLIST WET CHEMISTRY PARAMETERS BY VARIOUS METHODS

Reviewer/Date Mhadlih 12	1/2	111
Sr. Review/Date Chins Ricardi	14	112
Lab Report # 360-37551-1		
Project # 6/07/100/6,12		

specific Conductara chloride, rolfate, ammonia

Note: The following analyses will be evaluated according to the "MADEP QA/QC Guidelines for Sampling, Data Evaluation and Reporting Activities." MADEP, however, may not list QA/QC criteria for every chemical analysis. Where not defined by MADEP, criteria will default to values stipulated in the QAPP. Where the QAPP does not define criteria, QA/QC requirements will default to limits employed by the laboratory.

#### 1.0 <u>Laboratory Deliverable Requirements</u>

	1.1 Laboratory Information: Was all of the following provided in the laboratory report? Check items received.						
	☐ Name of Laboratory ☐ Address ☐ Project ID ☐ Phone #  Client Information: ☐ Name ☐ Address ☐ Client Contact	☑ Sample identification – Field and Laboratory					
	Client Information:   Name   Address   Client Contact	(IDs must be cross-referenced)					
ACTI(	ON: If no, contact lab for submission of missing or illegible information.	( a sum of the division of the					
	1.2 Laboratory Report Certification Statement	Yes [ ] No [ ] N/A [ ] Comments:					
	Does the laboratory report include a completed Analytical Report Certification in the r	required format?					
ACTIO	ACTION: If no, contact lab for submission of missing certification or certification with correct format.						
	1.3 Laboratory Case Narrative:	Yes [ ] No [ ] N/A [ ] Comments:					
	Narrative serves as an exception report for the project and method QA/QC performance.	☐ Narrative includes an explanation of each discrepancy on the					
		Certification Statement.					
ACTIO	N: If no, contact lab for submission of missing or illegible information.						
	1.4 Chain of Custody (COC) copy present with all documentation completed?	Yes No No N/A Comments:					
	Does the laboratory report include copies of Chain of Custody forms containing all samples in	this SDG?					
	NOTE: Olin receives and maintains the original COC.						

1.5 Sample Receipt Information (Cooler Receipt Form): Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

ACTION: If no, contact lab for submission of copy of missing completed COC.

	Yes [	No [ ]	N/A [ ]	Comments:
FIS				
☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered of	on the same d	ay as collecti	on, temperatu	re requirement does not apply).
Container type noted Condition observed pH verified (where applicable) Field and lab II	Ds cross refe	renced		
ACTION: If no, contact lab for submission of missing or incomplete documentation.				9
1.5.1 Were the correct bottles and preservatives used?	/			
Ammonia,— 1 Liter polyethylene/H <sub>2</sub> SO <sub>4</sub> to pH<2,cool to 4°C	Yes [_]	No [_]	N/A [_]	Comments:
Oil & Grease – 1 Liter glass/HCL or H2SO4 to pH<2,cool to 4°C				
Alkalinity – 1 Liter polyethylene/cool to 4°C				
Chemical Oxygen Demand - 50 mL polyethylene/H <sub>2</sub> SO <sub>4</sub> to pH<2,cool to 4°C				
Chloride, pH, sulfate, nitrate, nitrite - 50 mL polyethylene/cool to 4°C				
Nitrate/nitrite - H2SO4 to pH<2,cool to 4°C				
Organic Carbon - 500 mL amber glass bottle/HCl or H <sub>2</sub> SO <sub>4</sub> to pH<2,cool to 4°C				
Sulfide – 50 mL polyethylene/ZnAcetate + NaOH to pH>9, cool to 4°C				
Phenolics - H <sub>2</sub> SO <sub>4</sub> to pH<2,cool to 4°C				
✓specific conductance, TDS, TSS – 100 mL polyethylene/cool to 4°C				
ACTION: If no, inform senior chemist. Document justification for change in container/volume (if applicable), qualify positive and non-detect data (J) data if cooler temperature exceeds 10°C. Rejection of data requires professional judgment		7		
1.5.2 Were all samples delivered to the laboratory without breakage?	Yes [V	No [_]	N/A []	Comments:
1.5.3 Does the <i>Cooler Receipt Form</i> or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data?	Yes []	No 🗾	N/A [_]	Comments:

#### OLIN-WILMINGTON LEVEL I DATA QUALITY EVALUATION

#### STANDARD OPERATING PROCEDURE AND CHECKLIST WET CHEMISTRY PARAMETERS BY VARIOUS METHODS

	1.6 Sample Resi	ults Section: Was the in sample?	following information supplied in th	e laboratory Yes [ ] No [ ]	N/A [_]	Comments:	
☑ Matı		Date and time of Analysis method  Target analytes and	concentrations	Dilution Factor Date of preparation/extraction Units (soils must be reported	on/digestion clea	an-up and analysis, who	Reporting limiere applicable
ACTIC	JN: If no, contact la	b for submission of missi	ng or incomplete information.				*
				ratory report Yes No Laboratory duplicate results (where		Comments:	
⊔ Meti	nod blank results	☐ LCS recoveries ☐	MS/MSD recoveries and RPDs	Laboratory duplicate results (where	applicable)		
			ng or incomplete information.				
					29		
2.0	Holding Times	e e		Yes No No	N/A _]	Comments:	
	Have any technica 28 days = am	l holding times, determin monia, chemical oxyger	ned from date of collection to date of demand, chloride, organic carbon,	of analysis, been exceeded? The ho	lding times are	as follows:	
	Alkalinity =	14 days	Sulfide, TDS, TSS = 7 days	pH = analyze immediately		nitrogen as $N = 48 \text{ hr}$	s
		en as $N = 48$ hrs	Nitrate + Nitrite as $N = 28$ days				
			with # of days exceeded on checklist				
ACTIO: judgmen	N: If technical hol at used to qualify so:	ding times are exceeded ls.	qualify results (J). For water samp	oles that are grossly exceeded (>2X	hold time) reje	ect (R) all non-detect i	results. Professional
	3.0 Laborator	y Method		Yes No No	N/A []	Comments:	
	3.1 Was the correct	laboratory method used?	Ÿ				
ACTIO	N: If no, contact lab	to provide justification fo	or method change compared to the re	equested method. Contact senior cher	nist to inform C	lient of change or to re	quest variance.

			/
	3.2 Are the practical quantitation ☐ QAPP/IRSWP ☐ Lab?	limits the same as those specif	Tied by the Yes No No N/A Comments:
	Note: The MADEP QA/QC Guidelines of therefore all criteria will default to values s define criteria, QA/QC requirements defamay also apply.	tipulated in the QAPP*. Where the QA	NPP does not
	Ammonia* □ = 0.1 mg/ L	Alkalinity** $\square = 1 \text{ mg/L}$	Bicarbonate Alkalinity** $\Box = 1 \text{ mg/L}$ Carbonate Alkalinity** $\Box = 1 \text{ mg/L}$
	Nitrate Nitrogen as N* $\square$ = .05 mg/L	Nitrite Nitrogen as N* □ = .01 mg	,
	Spec. Cond.** 3 umhos/cm	Total Organic Carbon** □ = 1 mg	- /
	COD:* Low – 20 mg/L	COD* High - 50 mg/L □	$TDS* \square = 10 \text{ mg/L}$ $TSS* \square = 5 \text{ mg/L}$
	pH* $\square$ < 2 to > 12	Phenolic - 0.01 mg/L	
	Other parameter(list)	PQL=	$\square$ Source of PQL =
	Other parameter(list)	PQL =	$\square$ Source of PQL =
ACTIO	N: If no, evaluate change with respect to sa	ample matrix, preparation, dilution, me	pisture, etc. If sample PQL is indeterminate, contact lab for explanation.
	3.3 Are the appropriate parameter results p	present for each sample in the SDG?	Yes No No N/A Comments:
ACTIO	N: If no, check Request for Analysis to ver	ify if method was ordered and COC to	verify that it was sent, and contact lab for resubmission of the missing data
	3.4 If dilutions were required, were dilution		Yes No N/A Comments:
ACTIO	N: If no, contact the lab for submission.		
4.0	Method Blanks		Yes No No N/A Comments:
	4.1 Are the Method Blank Summaries pres	sent?	
ACTIO	N: If no, call the laboratory for submission	of missing data.	
	4.2 Was a method blank analyzed for each 20 or less?	h analysis batch of wet chemistry field	Yes No No Comments:

		W				
ACTIO	ACTION: If no, document discrepancy in case narrative and contact lab for justification. Consult senior chemist for action needed.					
	4.3 Is th	ne method blank less than the PQL? (See Section 3.2 for PQLs).	Yes 🗹	No [_]	N/A []	Comments:
	4.4 Do a	any method blanks have positive results for wet chemistry parameters? Qualify data ng to the following:	Yes [_]	No 🗾	N/A [_]	Comments:
	If the sar PQL or	imple concentration is $< 5 \times$ blank value, flag sample result non-detect "U" at the the concentration reported if greater than the PQL.				
	If the sa	imple concentration is $> 5 \times$ blank value, no qualification is needed.				
ACTIC qualifier	ON: If an	ny blank has positive results, list all the concentrations detected and flagging level (fla	agging level =	= 5 × blank v	value) on the c	hecklist. List all affected samples and their
5.0	Labora	tory Control Standards				
	5.1	Was a laboratory control standard (LCS) run with each analytical batch of 20 samples or less?	Yes [	No [_]	N/A []	Comments:
ACTIO udgmen	N: If no	o, call laboratory for LCS form submittal. If data is not available, use professional rmine qualification actions for data associated with the batch.				
	5.2	Is a LCS Summary Form present?	Yes [	No []	N/A []	Comments:
ACTIO	N: If no,	contact lab for resubmission of missing data.				
	5.3	Is any wet chemistry analyte LCS recovery outside the control limits?	Yes [_]	No 🔼	N/A [_]	Comments:

TOC	T :		4
LCS	L	m	IS:

Des Lames.							
Alkalinity** $\square = 80-120\%$ Total Organic Carbon** $\square = 80-120\%$ COD Low* $\square = 80-120\%$ Hardness* $\square = 80-120\%$	Bicarbonate Alkalinity** $\square = 80-120\%$ TDS** $\square = 80-120\%$ COD High* $\square = 80-120\%$ Chloride* $\square = 80-120\%$	Carbonate Alkalinit Oil & Grease* □ = Nitrate Nitrogen Sulfate (EPA 300.	= 80-120% as N**□ =	80-120%		trogen as N* gen as N**	= 80-120% = 80-120% = 80-120% TSS* NA
Other parameter(list)	%R =		☐ Rec Lin	nits=			
	%R =						
	(MADEP has not yet defined LCS recove				*		н
ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and no-detect results within the batch as (J). If LCS recovery is <10%, non-detect results are rejected (R).							
6.0 <u>Matrix Spikes</u>							
Matrix spikes may be collected at different fr specific schedules. Confirm spike requireme	requencies based on monthly, quarterly, ents for each set with the senior chemist.	or task					
6.1 Were project-specific MS/MSDs  ACTION: If no, contact senior chemist to see if a  6.2 Is the MS/MSD Recovery Forn		iked. Yes []	No []	N/A []	Comments:	OC-GW	and sulfate
ACTION: If no, contact lab for resubmission of a	•	Yes [	No []	N/A []	Comments:	CHOCK	10/10/1
matrix?	at the required frequency of 1 per 20 samp	oles per Yes	No []	N/A []	Comments:		
ACTION: If any matrix spike data is missing, cal	ll lab for resubmission.		024				
		Yes []	No [	N/A [_]	Comments:		

#### **OLIN-WILMINGTON** LEVEL I DATA QUALITY EVALUATION STANDARD OPERATING PROCEDURE AND CHECKLIST

#### WET CHEMISTRY PARAMETERS BY VARIOUS METHODS

6.4 Are any wet chemistry analyte spik	ce recoveries outside of the QC limits?			
NOTE: $R = (SS)$	<u>R-SR)</u> x 100%	Where		mple resul
512	SA = Spike added		SR = S	Sample result
MS/MSD Recovery Limits:				
Alkalinity* = NA Chloride*(SM 4500 Cl) $\square$ = 75-125%	Bicarbonate Alkalinity* = NA  Specific Conductivity * = NA	Carbonate alkalinity* = NA Total Organic Carbon* = NA	Ammonia* (LACHAT) $\square = 75-125\%$ TDS** = NA	6
Oil & Grease* = NA	COD Low* $\Box = 75-125\%$		Nitrate Nitrogen as N** $\square = 75-125\%$	V <sub>0</sub>
Nitrite Nitrogen as N** $\square = 75-125\%$	Hardness* $\square = 75-125\%$	Sulfate (EPA 300.0)* □ = 75-125%	$pH^* = NA$ $TSS^* = NA$	
Other parameter(list)	%R =	□ Rec Lim	its =	
	lin QAPP Limits (MADEP has not )			
NOTES: 1) If only one of the recoveries for 2) If the MS/MSD was performed	or an MS/MSD pair is outside of the cont by the laboratory on a non-project samp	trol limits, no qualification is necessary ple, no qualification is required.	. Use professional judgment for the M	S/MSD flags.
ACTION: MS/MSD flags only apply to the sample qualify positive results as estimated (J). If the recov MS/MSD recovery is < 30% and the sample is non-d	spiked. Do not evaluate if sample concereries of the MS and MSD are lower tha	entration is > 4X spike. If the recoveries	es of the MS and MSD exceed the upper qualify both positive results and non-de	er control limit, etects (J). If the
ACTION: Laboratory control limits apply when sp evaluated, but no flags are applied.	iked sample results fall within the norm	nal calibration range. If dilutions are re	quired due to high sample concentration	ons, the data is
6.5 Are any RPDs for MS/MSD recoveries	outside of the QA/QC limits?		•	
<b>NOTE</b> : RPD = $\frac{S - D}{(S + D)/2}$ x 100% When	ere S = MS result D = MSD result	Yes No No	/A [_] Comments:	
MS/MSD RPD Limits:				

#### 7.0 **Laboratory Duplicate**

 $RPD \le 20$ 

Are the RPDs for the laboratory duplicates <20% unless otherwise specified below?

Comments:

ACTI(	ACTION: If the RPD is greater than specified limits, qualify all results for that analyte as estimated (J).						
	pH* $\square = 3\%$ Specific Conductivity * $\square = 5\%$ TSS** $\square = 6\%$		Š	$TDS^{**} \square = 6\%$			
8.0	Sampling Accuracy			•			
The m with d	ajority of ground water samples are collected directly from a tap, process stream, or edicated tubing. Rinse blanks will not be collected.						
	8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist.	Yes []	No 🔝	N/A [_] Comments:			
	8.2 Do any rinsate blanks have positive results?	Yes []	No []	N/A Comments:			
ACTI	ON: Evaluate rinsate results vs. blank results to determine if contaminant may be labeled if the sample concentration is $< 5 \times$ blank value, flag sample result non-detect "U" at the PQ If the sample concentration is $> 5 \times$ blank value, no qualification is needed.						
NOTE	MADEP does not require the collection of rinsate blanks.						
9.0	Field Duplicates  9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates.	Yes []	No 🗾	N/A [_] Comments:			
QA	9.2 Were field duplicates collected per the required frequency?  PP/IRSWP □ MADEP Option 1(1 per 20) □ MADEP Option 3 (1 per 10) □	Yes []	No [_]	N/A Comments:			
	9.3 Was the RPD $\leq$ 30% for waters $\leq$ 50% for soils? Calculate the RPD for results and attach to this review.	Yes [_]	No []	N/A Comments:			

ACTION:. Qualify data (J) for both sample results if the RPD exceeded.				
Was any of the data qualified?	Yes []	No N/A	Comments:	
If so, apply data qualifiers directly to the DQE copy of laboratory report and flag pages for entry in database				

#### REFERENCES:-

MACTEC, 2007. "Draft Interim Response Steps Work Plan"; Olin Chemical Superfund Site, 51 Eames Street, Wilmington, Massachusetts.; Project No. 6300-06-0010/41.1; July 25, 2007.

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MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data in Support of Action Conducted Under the Massachusetts Contingency Plan (MCP)," WSC-CAM, Section VIIA, Final, Revision No. 1, 1 July 2010.

Version 1.3, Oct 2011

#### OLIN-WILMINGTON LEVEL I DATA QUALITY EVALUATION STANDARD OPERATING PROCEDURE AND CHECKLIST ICP METALS BY METHOD 6010B/200.7

Reviewer/Date	()	/2/11
Sr. Review/Date Chris Grandi	114	12
Lab Report # 360-37596-1	1	
Project # 6107 110016,12	0.0000	

		0.,		Troject #_	010 1110010	112
_oliss	dued aluminulm, chromium					
1.0	<u>Laboratory Deliverable Requirements</u>					·
	1.1 Laboratory Information: Was all of the following provided in the laboratory report?  Check items received.  Name of Laboratory Address Project ID Phone #  Client Information: Name Address Client Contact  Client Information: Client Contact  Name Project ID Client Contact  Name Description:	☑ Sampl	le identificat	N/A [] ion – Field and	Comments:  d Laboratory	
ACTIO	ON: If no, contact lab for submission of missing or illegible information.				9	
		Yes [🗾	No [_]	N/A []	Comments:	
Does to	he laboratory report include a completed Analytical Report Certification in the required fo	ormat?				3
ACTIO	N: If no, contact lab for submission of missing certification or certification with correct for	ormat.	/			
	1.3 Laboratory Case Narrative:	Yes []	No []	N/A []	Comments:	W
	Narrative serves as an exception report for the project and method QA/QC performents on the	rmance.	☐ Nan	rative include	es an explanatior	of each discrepancy
				Certificati	on Statement.	
ACTIO	N: If no, contact lab for submission of missing or illegible information.	,	/ .			
	1.4 Chain of Custody (COC) copy present with all documentation completed	Yes [_]	No []	N/A [_]	Comments:	
	NOTE: Olin receives and maintains the original COC.					
ACTIO	N: If no, contact lab for submission of copy of completed COC.					

	1.5 Sample	e Receij	pt Inforn	nation (Co	ooler Red	eipt Form	present?):		Yes [	No[]	N/A [ ]	Comments:	
_	into the labo	oratory?					upon receipt of	<del>e</del> . dese					
Sam	ple temperatur	re confi	rmed: mu	st be 1° – ndition ob	10° C. (If	samples wer	e sent by courie	er and delivered	on the same	day as colle	ction, tempera	ture requirement does not ap	pply).
							documentation.						
	1.5.1	Wer	e all sam	ples delive	ered to the	laboratory w	vithout breakage	e?	Yes [_]	No [_]	N/A []	Comments:	
	1.5.2	with	ı sample r	eceipt, con	ndition of t	or Lab Narr the samples, y of the data	analytical prob	other problems lems or special	Yes []	No 🔝	N/A [_]	Comments:	
	1.6 Sampl	e Resu ory repo	Its Section	on: Was o h sample?	each of th	ne following	requirements s	supplied in the	Yes [	No [_]	N/A []	Comments:	
☑ MFi □ Cle □ Ma	eld ID and La ean-up method trix	b ID	Targ	Date and t analysis m get analyte	ime collectethod s and conc	ted entrations	Analyst Ini	itials ion method	Dilution Date of pats (soils mus	Factor preparation/o t be reported	extraction/dige d in dry weigh	moisture or solids astion clean-up and analysis	Reporting limits, where applicable
ACTI	ON: If no, co	ntact lal	b for subr	nission of	missing or	· incomplete	information.			<i>(</i>			
	1.7 QA/QO laboratory r	C Information Information	rmation: or each sa	Was ead	ch of the n?	following	information su	applied in the	Yes [	No [_]	N/A []	Comments:	

		/						
Metho	od blank res	ults  LCS recoveri	es MS/MSD recoveries and RPDs	Laboratory	duplicate res	sults (where	applicable)	
ACTION	V: If no, cor	tact lab for submission	of missing or incomplete information.					
2.0 <u>I</u>	Holding T	imes						
			¥	8				
9	technical exceeded? water and so	Holding time for metals	ned from date of collection to date of s is 180 days from sample collection to an	analysis, been nalysis for both	Yes [_]	No 🔄	N/A _]	Comments:
NOTE: I	ist samples	that exceed hold time v	with # of days exceeded on checklist					
ACTION	N: If techni (UJ). If gro	cal holding times are e ssly exceeded (2X hold	xceeded, qualify all positive results (J) a ing time) reject (R) all non-detect results.	and non-detects				
3.0	Laborator	y Method						
:	3.1 W	as the correct laborate	ory method used?		Yes L	No [_]	N/A [_]	Comments:
	So	ater Digestion il Digestion etals	3005A or 3010A or 3020A 3050B 6010B or 200.7					
compa	ON: If n ared to the request va	requested method. C	ry to provide justification for me Contact senior chemist to inform Clie	ethod change ent of change	,			
Š	3.2 Ar	e the practical quant □ SOW □ QAP	itation limits the same as those spe P □ Lab □ MADEP	ecified by the	Yes [_]	No [_]	N/A [_]	Comments:
NOTE	: Verify that	the reported metals ma	atch the target list specified on the COC.					
NOTE		□ SOW ☑ QAP	P □ Lab □ MADEP					

6010

ACTION moisture,	V: If no, evaluate variation with respect to sample matrix, preparation, dilution, etc. If sample PQL is indeterminate, contact lab for explanation.	,			
3.3	Are results present for each sample in the SDG?	Yes [_]	No []	N/A [_]	Comments:
ACTION: I	f no, check Request for Analysis to verify if method was ordered and COC to verify that i				
3.4	If dilutions were required, were dilution factors reported?	Yes 🔝	No [_]	N/A []	Comments:
ACTION: I	f no, contact the lab for submission.				
4.0 <u>M</u>	ethod Blanks				
4.1	Is the Method Blank Summary present?	Yes [_]	No [_]	N/A []	Comments:
ACTION	V: If no, call the laboratory for submission of missing data.		_		
4.2	Frequency of Analysis: Was a method blank analyzed for each digestion batch of $<$ 20 field samples?	Yes 📝	No [_]	N/A []	Comments:
ACTION needed.	N: If no, contact laboratory for justification. Consult senior chemist for action Narrate non-compliance.				96
4.3	Is the method blank less than the PQLs for all target elements?	Van L	N- F I	N/A []	
NOTE: samples	MADEP requires the method blank to be matrix matched and digested with the	res 🗾	100	N/A	Comments:
4.4 the	Do any method blanks have positive results for metals? Qualify data according to following:	Yes []	No 🚺	N/A [_]	Comments:

If the sample concentration is $< 5 \times$ blank value,	flag sample result non-detect "U" at th	e
PQL or the concentration reported if greater than	n the PQL.	_

If the sample concentration is  $> 5 \times$  blank value, no qualification is needed.

**ACTION:** For any blank with positive results, list all contaminants for each method blank including the concentration detected and the flagging level (flagging level = 5x the blank value) and the associated samples and qualifiers.

5.0	Labo	ratory Control Standard				
	5.1	Was a laboratory control standard run with each analytical batch of 20 samples or less?	Yes [	No [_]	N/A []	Comments:
ACT	ION:	Langet, second source LCS is required by MADEP.  Call laboratory for LCS form submittal. If data are not available, use light judgement to evaluate data accuracy associated with that batch.		/ ·		
	5.2	Is a LCS Summary Form present?	Yes [	No [_]	N/A [_]	Comments:
ACT		If no, contact lab for resubmission of missing data.			/	
		Is the recovery of any analyte outside of MADEP control limits?  MADEP le Type % Rec	Yes []	No [_]	N/A [_]	Comments:
	Water Soil	80-120 within Lab generated limits				
non-	ION: n the letects	If recovery is above the upper limit, qualify all positive sample results patch as (J). If recovery is below the lower limit, qualify all positive and results within the batch as (J). If LCS recovery is <30%, positive and non-es are rejected (R).				

6010

Comments:

#### 6.0 **Matrix Spikes**

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

- Were project-specific MS/MSDs analyal? List project samples that were 6.1 (D)12/11

No [] N/A [] Comments: OC-Gw-26

ACTION: If no, contact senior chemist to see if any were specified.

Is the Matrix Spike/Matrix Spike Duplicate Recovery Form present? 6.2

Yes [ No [ ] N/A [ ] Comments:

NOTE: A full target, second source MS/MSD is required by MADEP.

ACTION: If any matrix spike data are missing, call lab for resubmission.

6.3 Were matrix spikes analyzed as indicated on the COC and project schedule?

Yes [ No [ N/A [ ] Comments:

ACTION: If any matrix spike data are missing, call lab for resubmission. If none, no qualification is needed. Narrate non-compliance.

Are any metal spike recoveries outside of the QC limits? 6.4

Yes []	No [ N/A [ ]	Comments:

	MADEP	QAPP	
Sample Type	% Rec	% Rec	Method
Water	75-125	N/A	6010B
Water	N/A	70-130	200.7
Soil	75-125	75-125	6010B

NOTE: 
$$%R = (SSR-SR) \times 100\%$$
  
SA

$$SA = Spike added$$

NOTE: If dilutions are required due to high sample concentrations (> 4X spike), the data are evaluated, but no flags are applied.

NOTE: If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags. ACTION: MS/MSD flags only apply to the sample spiked. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit, qualify positive results and non-detects (J). Yes No N/A Comments:

MS only. Are any RPDs for MS/MSD recoveries outside of the QC limits? 6.5 NOTE:  $RPD = S-D \times 100\%$ Where: S = MS sample result (S+D)/2D = MSD sample result NOTE: If dilutions are required due to high sample concentrations, the data are evaluated, but no flags are applied. ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects (J).7.0 Laboratory Duplicate 7.1 Was a laboratory duplicate sample analyzed? If so, is the Laboratory Yes [ No [ Duplicate Sample Form present? NOTE: MADEP refers to this sample as a "matrix duplicate". ACTION: If not analyzed, qualification is not needed. If data is missing, contact laboratory for resubmission of report. Narrate non-compliance. 7.2 Is the RPD between the result for the laboratory duplicate sample and the result for the parent sample outside of the QA/QC limits?

MADEP Laboratory Duplicate Sample RPD Criteria:	QAPP RPD
For aqueous results > $5 \times$ RL, RPD must be $\pm 20\%$	20
For aqueous results $< 5 \times RL$ , RPD must be $\leq RL$	20
For soil/sediment results > $5 \times$ RL, RPD must be $\pm 35\%$	20
For soil/sediment results $< 5 \times RL$ , RPD must be $\leq 2 \times RL$	20

**ACTION**: If the RPD exceeds the limits, qualify both positive results and non-detects as estimated and flag them J. Narrate non-compliance

#### 8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

- 8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist.
- 8.2 Do any rinsate blanks have positive results?

NOTE: MADEP does not require the collection of rinsate blanks.

**ACTION:** Evaluate rinsate results against blank results to determine if contaminant may be laboratory-derived. If results are not lab-related, qualify according to below.

If the sample concentration is  $< 5 \times$  blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is  $> 5 \times$  blank value, no qualification is needed.

#### 9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates.

Yes No N/A Comments

	9.2 Were field duplicates collected per the required frequency?	Yes []	No []	N/A [	Comments:
SO	W □ QAPP (1 per 10) □ MADEP Option 1 (1 per 20) □ MADEP Option 3 (1 per 10) □				/ .
	9.3 Was the RPD $\leq$ 50% for soils or waters? Calculate the RPD for all results and attach to this review.	Yes []	No [_]	N/A	Comments:
ACTIO	ON: RPD must be ≤50% for soil and water. Qualify data (J) for both sample results in	f the RPD e	exceeds 50°	%.	
10.0	Special QA/QC				
	10.1 Were both total and dissolved metals analysis performed? If so, the dissolved metal concentration should not exceed that of the total metal.	Yes []	No 🔝	N/A [_]	Comments:

10.0	Application	of '	Validation	<b>Qualifiers</b>

Was any of the data qualified?

Yes []	No [	N/A []	Comments		

If so, apply data qualifiers directly to the DQE copy of laboratory report and flag pages for entry in database.

#### REFERENCES

- LAW, 1999, "Final Quality Assurance Project Plan, Olin Wilmington Property, 51 Eames Street, Wilmington, MA", LAW Engineering and Environmental Services, Kennesaw, GA 30144. August 1999
- U.S. Environmental Protection Agency (USEPA), 1989. "Region 1 Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses"; Hazardous Site Evaluation Division; February 1989.
- MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Compendium of Quality Control Requirements and Performance Standards for Selected Analytical Protocols," WSC-CAM #10-320, Final, Revision No. 1, 1 July 2010.
- MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data in Support of Action Conducted Under the Massachusetts Contingency Plan (MCP)," WSC-CAM, Section VIIA, Final, Revision No. 1, 1 July 2010.
- MADEP, 2010. "Quality Control Requirements and Performance Standards for the Analysis of Trace Metals by Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES) in Support of Response Actions under the Massachusetts Contingency Plan (MCP)" WSC-CAM, Final, Revision No. 1, 5 July 2010.

Version 3, October 2008

# OLIN-WILMINGTON LEVEL I DATA QUALITY EVALUATION STANDARD OPERATING PROCEDURE AND CHECKLIST WET CHEMISTRY PARAMETERS BY VARIOUS METHODS

Reviewer/Date Manuellly	. /	2/2/
Sr. Review/Date Chus Ricardi 1	14	117
Lab Report # 360 - 37596-1	-	
Project # 6107 110016,12		

Spee. Cond. Chloride sulfate Ammenia.

NOTE: Olin receives and maintains the original COC.

ACTION: If no, contact lab for submission of copy of missing completed COC.

1.5 Sample Receipt Information (Cooler Receipt Form): Were each of the following

tasks completed and recorded upon receipt of the sample(s) into the laboratory?

Note: The following analyses will be evaluated according to the "MADEP QA/QC Guidelines for Sampling, Data Evaluation and Reporting Activities." MADEP, however, may not list QA/QC criteria for every chemical analysis. Where not defined by MADEP, criteria will default to values stipulated in the QAPP. Where the QAPP does not define criteria, QA/QC requirements will default to limits employed by the laboratory.

#### 1.0 <u>Laboratory Deliverable Requirements</u>

1.1 Laboratory Information: Was all of the following provided in the laboratory report? Check items received.	Yes No NA Comments:						
☐ Name of Laboratory ☐ Address ☐ Project ID ☐ Phone # Client Information: ☐ Name ☐ Address ☐ Client Contact	Sample identification – Field and Laboratory						
	(IDs must be cross-referenced)						
ACTION: If no, contact lab for submission of missing or illegible information.							
1.2 Laboratory Report Certification Statement	Yes [ No [ ] N/A [ ] Comments:						
Does the laboratory report include a completed Analytical Report Certification in the	required format?						
ACTION: If no, contact lab for submission of missing certification or certification with correct format.							
1.3 Laboratory Case Narrative:	Yes [ ] No [ ] N/A [ ] Comments:						
Narrative serves as an exception report for the project and method QA/QC performance	. ☐ Narrative includes an explanation of each discrepancy on the						
	Certification Statement.						
ACTION: If no, contact lab for submission of missing or illegible information.							
1.4 Chain of Custody (COC) copy present with all documentation completed?	Yes No No N/A Comments:						
Does the laboratory report include copies of Chain of Custody forms containing all samples in	n this SDG?						

	Yes 💹	No [_]	N/A []	Comments:
Sample temperature confirmed: must be $1^{\circ} - 10^{\circ}$ C. (If samples were sent by courier and delivered	on the same of	lay as collect	ion, temperati	ire requirement does not apply)
Container type noted Condition observed pH verified (where applicable) Field and lab	IDs cross refe	renced	, 1	and appropries.
ACTION: If no, contact lab for submission of missing or incomplete documentation.		/		
1.5.1 Were the correct bottles and preservatives used?				
Ammonia,—1 Liter polyethylene/H <sub>2</sub> SO <sub>4</sub> to pH<2,cool to 4°C	Yes [_]	No [_]	N/A [_]	Comments:
Oil & Grease – 1 Liter glass/HCL or H2SO4 to pH<2,cool to 4°C				
Alkalinity – 1 Liter polyethylene/cool to 4°C				
Chemical Oxygen Demand – 50 mL polyethylene/H <sub>2</sub> SO <sub>4</sub> to pH<2,cool to 4°C				
Chloride, pH, sulfate, nitrate, nitrite - 50 mL polyethylene/cool to 4°C				
Nitrate/nitrite - H2SO4 to pH<2,cool to 4°C				
Organic Carbon – 500 mL amber glass bottle/HCl or H <sub>2</sub> SO <sub>4</sub> to pH<2,cool to 4°C				
Sulfide – 50 mL polyethylene/ZnAcetate + NaOH to pH>9, cool to 4°C				
Phenolics - H <sub>2</sub> SO <sub>4</sub> to pH<2,cool to 4°C				
Specific conductance, TDS, TSS – 100 mL polyethylene/cool to 4°C				
ACTION: If no, inform senior chemist. Document justification for change in container/volume (if applicable), qualify positive and non-detect data (J) data if cooler temperature exceeds 10°C. Rejection of data requires professional judgment				
1.5.2 Were all samples delivered to the laboratory without breakage?	Yes	No []	N/A [_]	Comments:
1.5.3 Does the Cooler Receipt Form or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data?	Yes []	No [_]	N/A []	Comments:

#### OLIN-WILMINGTON LEVEL I DATA QUALITY EVALUATION TANDARD OPERATING PROCEDURE AND CHECKLY

#### STANDARD OPERATING PROCEDURE AND CHECKLIST WET CHEMISTRY PARAMETERS BY VARIOUS METHODS

1.6 Sample Resurreport for each	ults Section: Was the following sample?	ing information supplied in the	laboratory  Yes No No	N/A [ ]	Comments:	
/		,	<i>a</i>			
Field ID and Lab ID Clean-up method	Date and time collected Analysis method	ed Analyst Initials Preparation method	Dilution Factor Date of preparation/extraction	/digestion clear	pisture or solids	Reporting limit
Matrix Matrix	Target analytes and conc		Units (soils must be reported		ir up and anarysis, where	аррисавіе
ACTION: If no, contact lal	b for submission of missing or		El Cints (sons must be reported	in dry weight)		
0	or modified of	meompiete information.				
1.7 QA/QC Information for each sample bat	mation: Was the following inf	formation provided in the laborate	ory report Yes No	N/A []	Comments:	
	)	3		Ø.		
Method blank results	TICS recoveries TIMSA	ACD recoveries and DDD	4 aboratory duplicate results (where a			
January Charles 1050115	TECH ICCOVERIES IN INITIAL	ASD recoveries and RPDs LAL	aboratory duplicate results (where	applicable)		
ACTION: If no, contact lab	o for submission of missing or	incomplete information.				
2.0 ************************************	×		/			
2.0 <u>Holding Times</u>			Yes No No	N/A]	Comments:	
Have any technical	I holding times determined for	com data af a 11 - 12 - 1 - 1 - 0				
28 days = om	morale alease of	om date of collection to date of a	analysis, been exceeded? The hold	ling times are a	as follows:	
20 days – am	unoma, chemical oxygen dem	and, chloride, organic carbon, oi	il & grease, specific conductance,	total organic ca	arbon and sulfate	
Alkalinity = 1	Page Control C	Ifide, $TDS$ , $TSS = 7$ days	pH = analyze immediately	Nitrate	nitrogen as N = 48 hrs	
Nitrite nitrog	en as $N = 48$ hrs Nit	trate + Nitrite as N = 28 days				
NOTE: List sample	es that exceed hold time with #	of days exceeded on checklist				
			s that are grossly exceeded (>2X l	hold time) reje	ct (R) all non-detect res	sults. Professional
3.0 Laborator	y Method		Yes [ No [	N/A []	Comments:	
3.1 Was the correct	laboratory method used?					
ACTION: If no, contact lab	to provide justification for me	thod change compared to the requ	nested method. Contact senior chem	ist to inform Cl	lient of change or to requ	nest variance.

	Si Si			
	3.2 Are the practical quantitation ☐ QAPP/IRSWP ☐ Lab?	limits the same as those specif	Tied by the Yes No No N/A	Comments:
	Note: The MADEP QA/QC Guidelines of therefore all criteria will default to values of define criteria, QA/QC requirements defamay also apply.	TIDILIATED IN the CAPD* Whore the CA	DD dagger	
	Ammonia* □ = 0.1 mg/ L  Nitrate Nitrogen as N* □ = .05 mg/L  Spec. Cond.** □ 3 umhos/cm  COD:* Low – 20 mg/L	Alkalinity** $\square = 1 \text{ mg/L}$ Nitrite Nitrogen as N* $\square = .01 \text{ mg}$ Total Organic Carbon** $\square = 1 \text{ mg}$ COD* High - 50 mg/L $\square$	g/L Oil & Grease* $\square = 5.5 \text{ mg/L}$	Carbonate Alkalinity** $\square = 1 \text{ mg/L}$ Hardness * $\square = 2 \text{ mg/L}$ Sulfate (EPA 300.0)* $\square = 2 \text{ mg/L}$ TSS* $\square = 5 \text{ mg/L}$
	pH* $\square$ < 2 to > 12 Other parameter(list)	Phenolic - 0.01 mg/L POL =		
\CTIO	Other parameter(list)	PQL =	☐ Source of PQL =	
10	3.3 Are the appropriate parameter results I	present for each sample in the SDG?	Yes No NA Verify that it was sent, and contact lab for resubmission	Comments:
	3.4 If dilutions were required, were dilution	factors reported?	Yes No No N/A	Comments:
CTIO	N: If no, contact the lab for submission.			
.0	Method Blanks		Yes No No N/A	Comments:
	4.1 Are the Method Blank Summaries pres N: If no, call the laboratory for submission			
	4.2 Was a method blank analyzed for each 20 or less?		samples of Yes No No N/A	Comments:

ACTIO	ACTION: If no, document discrepancy in case narrative and contact lab for justification. Consult senior chemist for action needed.								
	4.3 Is th	e method blank less than the PQL?	(See Section 3.2 for PQLs).	Yes 🗹	No [_]	N/A [_]	Comments:		
	accordin	ng to the following:	sults for wet chemistry parameters? Qualify data	Yes []	No [_]	N/A [_]	Comments:		
	PQL or	mple concentration is $< 5 \times$ blank verther the concentration reported if greater	alue, flag sample result non-detect "U" at the than the PQL.						
	If the sa	mple concentration is $> 5 \times \text{blank v}$	alue, no qualification is needed.						
ACTIO qualifier	ACTION: If any blank has positive results, list all the concentrations detected and flagging level (flagging level = 5 × blank value) on the checklist. List all affected samples and their qualifiers.								
5.0	Labora	tory Control Standards							
	5.1	Was a laboratory control standar samples or less?	d (LCS) run with each analytical batch of 20	Yes 💹	No [_]	N/A []	Comments:		
ACTIO judgmer	N: If no nt to deter	, call laboratory for LCS form sub mine qualification actions for data a	mittal. If data is not available, use professional associated with the batch.						
	5.2	Is a LCS Summary Form present?		Yes 💹	No [_]	N/A []	Comments:		
ACTIO	N: If no,	contact lab for resubmission of mis	sing data.						
	5.3	Is any wet chemistry analyte LCS a	recovery outside the control limits?	Yes []	No 🔝	N/A [_]	Comments:		

#### OLIN-WILMINGTON LEVEL I DATA QUALITY EVALUATION STANDARD OPERATING PROCEDURE AND CHECKLIST

#### WET CHEMISTRY PARAMETERS BY VARIOUS METHODS

LCS	I imite:									
LCS	Limits:  Alkalinity** $\square = 80\text{-}120\%$ Total Organic Carbon** $\square = 80\text{-}120\%$ COD Low* $\square = 80\text{-}120\%$ Hardness* $\square = 80\text{-}120\%$ Other parameter(list)	COD High* $\Box = 80-120\%$ Chloride* $\Box = 80-120\%$	Oil & Grease*   Nitrate Nitrogen Sulfate (EPA 300)	Carbonate Alkalinity** $\square = 80-120\%$ Oil & Grease* $\square = 80-120\%$ Nitrate Nitrogen as N** $\square = 80-120\%$ Sulfate (EPA 300.0)* $\square = 80-120\%$		Specific Conductivity $* \square = 80-120\%$ Ammonia Nitrogen as N* $\square = 80-1$ Nitrite Nitrogen as N** $\square = 80-1$ pH* $\square = 98-102\%$ TSS* N.	20% 120% A			
		%R =	4	☐ Rec Li	mits=					
	Other parameter(list)	%R =		☐ Rec Li	mits =					
ACTIC within t	(MADEP has not yet defined LCS recovery limits for wet chemistry analyses.)  ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and no-detect results within the batch as (J). If LCS recovery is <10%, non-detect results are rejected (R).									
6.0	Matrix Spikes					á				
Matrix specific	spikes may be collected at different as schedules. Confirm spike requirem	frequencies based on monthly, quarterly, ents for each set with the senior chemist.	or task							
		s analyzed? List project samples that were sp		/						
ACTIO	N: If no, contact senior chemist to see if	any were specified.	Yes []	No [/]	N/A []	Comments:				
	6.2 Is the MS/MSD Recovery For	m present?			/					
ACTIO	N: If no, contact lab for resubmission of	missing data.	Yes []	No []	N/A [/]	Comments:				
	matrix?	at the required frequency of 1 per 20 samp	t = 5	No[]	N/A [ ]	Comments:				
ACTIO	N: If any matrix spike data is missing, ca	all lab for resubmission.				EAAW I				
			Yes []	No [_]	N/A []	Comments:				

#### OLIN-WILMINGTON

LEVEL I DATA QUALITY EVALUATION	
STANDARD OPERATING PROCEDURE AND CHECKLIST	
WET CHEMISTRY PARAMETERS BY VARIOUS METHODS	

				- The second of
6.4 Are any wet chemistry analyte spi	ike recoveries outside of the QC limits?			
NOTE: $%R = (SS)$	<u>SR-SR)</u> x 100%	Where	e: SSR =	Spiked sample resu
	SA = Spike added			SR = Sample resu
MS/MSD Recovery Limits:				
Alkalinity* = $NA$	Bicarbonate Alkalinity* = NA	Carbonate alkalinity* = NA	Ammonia* (LACHA	T) $\square = 75_125\%$
Chloride*(SM 4500 Cl) □= 75-125%	Specific Conductivity * = NA	Total Organic Carbon* = NA	$TDS^{**} = NA$	1) 🗆 = 73-12376
Oil & Grease* = NA	COD Low* $\Box = 75-125\%$	COD High* $\Box = 75-125\%$	Nitrate Nitrogen as N	** \( \preceq = 75_125\)\( \text{\( \) \}
Nitrite Nitrogen as N** $\square = 75-125\%$	Hardness* $\square = 75-125\%$	Sulfate (EPA 300.0)* $\Box = 75-125\%$		
Other parameter(list)	% R =			
FION: MS/MSD flags only apply to the sample ify positive results as estimated (J). If the recover MSD recovery is < 30% and the sample is non-confion.  FION: Laboratory control limits apply when squated, but no flags are applied.  6.5 Are any RPDs for MS/MSD recoveries	e spiked. Do not evaluate if sample conceveries of the MS and MSD are lower that detect, the results are considered unusable piked sample results fall within the normal coutside of the QA/QC limits?	ple, no qualification is required.  centration is > 4X spike. If the recoverie an the lower control limit but > 30%, of the and flagged (R).  nal calibration range. If dilutions are re-	es of the MS and MSD qualify both positive res equired due to high san	exceed the upper control limits and non-detects (J). If the
NOTE: RPD = $\frac{S - D}{(S + D)/2}$ x 100% Wh	here $S = MS$ result $D = MSD$ result	Yes [_] No [_] N	I/A Comments	:
MS/MSD RPD Limits:				
RPD ≤20		*		
Laboratory Duplicate		*		
Are the RPDs for the laboratory duplicates	s <20% unless otherwise specified belo	w? Yes [ ] No [ ] N	Comments	

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ACTIC	<b>DN</b> : If the RPD is greater than s	specified limits, qualify all results for that a	analyte as estimated (J)	١.					
	pH* □ = 3%	Specific Conductivity $*\Box = 5\%$	TSS** $\square = 6\%$		Т	$\Gamma DS^{**} \square = 6\%$	ó		
8.0	Sampling Accuracy			8		2			
The man	ajority of ground water same	ples are collected directly from a tap, ks will not be collected.	process stream, or						
	8.1 Were rinsate blanks colleassociated samples from the s	ected? Prior to evaluating rinsate blanks enior chemist.	s, obtain a list of the	Yes []	No [_]	N/A	Comments:		
	8.2 Do any rinsate blanks hav	e positive results?		Yes [_]	No [_]	N/A [_]	Comments:		
A COTT	ONL E 1								
ACII	JN: Evaluate rinsate results	vs. blank results to determine if conta	minant may be labor	ratory-deriv	ed. If not la	ab-related, qu	alify according	to the table be	low.
	If the sample concentration is	$s < 5 \times blank$ value, flag sample result non-	-detect "U" at the POI	or the conce	entration repo	orted if granter	than the DOI		
				or the conec	ondation repe	ricd if greater	man me PQL.		
	If the sample concentration is	$s > 5 \times blank$ value, no qualification is nee	ded.		æ				
NOTE:	MADEP does not require th	ne collection of rinsate blanks.						*	
9.0	Field Duplicates								
	9.1 Were field duplicate sa field duplicates.	amples collected? Obtain a list of samples	s and their associated	Yes [_]	No []	N/A [_]	Comments:		
	9.2 Were field duplicates col	lected per the required frequency?		Yes [ ]	No [ ]	N/A [	Comments:		
QA	PP/IRSWP □ MADEP Op	tion 1(1 per 20) ☐ MADEP Option	3 (1 per 10) □	•			/		
	9.3 Was the RPD $\leq$ 30% for attach to this review.	waters $\leq$ 50% for soils? Calculate the R	PD for results and	Yes [_]	No [_]	N/A	Comments:		

ACTION:. Qualify data (J) for both sample results if the RPD exceeded.				
Was any of the data qualified?				
	Yes [_]	No [	N/A [_]	Comments:
If so, apply data qualifiers directly to the DQE copy of laboratory report and flag pages for entry in database.				

#### REFERENCES:-

MACTEC, 2007. "Draft Interim Response Steps Work Plan"; Olin Chemical Superfund Site, 51 Eames Street, Wilmington, Massachusetts.; Project No. 6300-06-0010/41.1; July 25, 2007.

MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Compendium of Quality Control Requirements and Performance Standards for Selected Analytical Protocols," WSC-CAM #10-320, Final, Revision No. 1, 5 July 2010.

MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data in Support of Action Conducted Under the Massachusetts Contingency Plan (MCP)," WSC-CAM, Section VIIA, Final, Revision No. 1, 1 July 2010.

Version 3, October 2008

### OLIN-WILMINGTON LEVEL I DATA QUALITY EVALUATION STANDARD OPERATING PROCEDURE AND CHECKLIST WET CHEMISTRY PARAMETERS BY VARIOUS METHODS

Reviewer/Date ///	1	,	12/7/0
Sr. Review/Date Chris Ricardi	1	14	12
Lab Report # 360 - 37491 - 1			
Project # 6107 110016.12			

immonia spec conductance, sulfate, chloricle, nitrate nitrate

Note: The following analyses will be evaluated according to the "MADEP QA/QC Guidelines for Sampling, Data Evaluation and Reporting Activities." MADEP, however, may not list QA/QC criteria for every chemical analysis. Where not defined by MADEP, criteria will default to values stipulated in the QAPP. Where the QAPP does not define criteria, QA/QC requirements will default to limits employed by the laboratory.

#### 1.0 <u>Laboratory Deliverable Requirements</u>

	<b>1.1 Laboratory Information</b> : Was all of the following provided in the laboratory report? Check items received.	Yes No NA Comments:
	☐ Name of Laboratory ☐ Address ☐ Project ID ☐ Phone #  Client Information: ☐ Name ☐ Address ☐ Client Contact	Sample identification – Field and Laboratory
	Client Information:	(IDs must be cross-referenced)
ACTIO	<b>ON</b> : If no, contact lab for submission of missing or illegible information.	
	1.2 Laboratory Report Certification Statement	Yes [ ] No [ ] N/A [ ] Comments:
	Does the laboratory report include a completed Analytical Report Certification in the r	equired format?
ACTIO	N: If no, contact lab for submission of missing certification or certification with correct f	
	1.3 Laboratory Case Narrative:	Yes [ ] No [ ] N/A [ ] Comments:
	Narrative serves as an exception report for the project and method QA/QC performance.	,
		Certification Statement.
ACTIO	N: If no, contact lab for submission of missing or illegible information.	
	1.4 Chain of Custody (COC) copy present with all documentation completed?	Yes [ ] No [ ] N/A [ ] Comments:
	Does the laboratory report include copies of Chain of Custody forms containing all samples in	this SDG?

**NOTE:** Olin receives and maintains the *original* COC.

ACTION: If no, contact lab for submission of copy of missing completed COC.

**1.5 Sample Receipt Information (Cooler Receipt Form):** Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

		Yes [ No [ ]	N/A [ ]	Comments:
Sample temperature	confirmed: must be $1^{\circ} - 10^{\circ}$ C. (If samples were sent by courier and delivered of	on the same day as collec	tion, temperatu	re requirement does not apply).
☐ Container type note	d Condition observed pH verified (where applicable) Field and lab II	Os cross referenced		
ACTION: If no, conta	act lab for submission of missing or incomplete documentation.	1		
1.5.1	Were the correct bottles and preservatives used?			
/Ammonia,-	1 Liter polyethylene/H <sub>2</sub> SO <sub>4</sub> to pH<2,cool to 4°C	Yes No No	N/A []	Comments:
Oil & Greas	e – 1 Liter glass/HCL or H2SO4 to pH<2,cool to 4°C			
Alkalinity –	1 Liter polyethylene/cool to 4°C			
Chemical O	xygen Demand – 50 mL polyethylene/H <sub>2</sub> SO <sub>4</sub> to pH<2,cool to 4°C			
Chloride, pI	H, sulfate, nitrate, nitrite - 50 mL polyethylene/cool to 4°C			
Nitrate/nitri	te - H2SO4 to pH<2,cool to 4°C			
Organic Car	rbon – 500 mL amber glass bottle/HCl or H <sub>2</sub> SO <sub>4</sub> to pH<2,cool to 4°C			
Sulfide – 50	mL polyethylene/ZnAcetate + NaOH to pH>9, cool to 4°C			
Phenolics -	H <sub>2</sub> SO <sub>4</sub> to pH<2,cool to 4°C			
Specific con	nductance, TDS, TSS – 100 mL polyethylene/cool to 4°C			
9				
container/volume (i	, inform senior chemist. Document justification for change in f applicable), qualify positive and non-detect data (J) data if cooler 10°C. Rejection of data requires professional judgment			
		,		
1.5.2	Were all samples delivered to the laboratory without breakage?	Yes No No	N/A []	Comments:
1.5.3	Does the Cooler Receipt Form or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data?  OL SW - P $\geq$ 17	Yes No [] loride plates	N/A[]	Comments: Due to the preserver  OC-SW-15003, OC-SW-PZIGRR,  a lox diluter. Rhis 110 elem
		50	, , , ,	, contract

Page 2 of 9

#### **OLIN-WILMINGTON** LEVEL I DATA QUALITY EVALUATION

#### STANDARD OPERATING PROCEDURE AND CHECKLIST

WET CHEMISTRY PARAMETERS BY VARIOUS METHODS

1	report for each	Ilts Section: Was the for sample?	ollowing information supplied in the		No [_]	N/A [_]	Comments:				
☑ Æield ☑ Clean-	ID and Lab ID up method	Date and time co	ollected Analyst Initials Preparation method	Dilution Fa	actor /extraction/	/digestion clear	oisture or solids n-up and analysis,	Reporting limits where applicable			
☑ Matrix		☐ Target analytes and	concentrations	Units (soils must be				11			
ACTION	I: If no, contact la	b for submission of missin	ng or incomplete information.		<i>'</i>						
	1.7 QA/QC Information: Was the following information provided in the laboratory report Yes [_] No [_] N/A [_] Comments:										
AZI Metho	d blank results	LCS recoveries II	MS/MSD recoveries and RPDs	aboratory duplicate resul	ts (where a	pplicable)					
ACTION	: If no, contact lab	for submission of missin	ng or incomplete information.								
2.0 <u>I</u>	Holding Times			Yes []	No [	N/A]	Comments:				
H	Have any technical 28 days = am	holding times, determin monia, chemical oxygen	ed from date of collection to date of a demand, chloride, organic carbon, or	analysis, been exceeded?	The hold:	ing times are a	us follows:				
	Alkalinity =	14 days	Sulfide, TDS, TSS = 7 days	pH = analyze immedia		. /	nitrogen as $N = 48$	R hre			
	/Nitrite nitrog	en as $N = 48 \text{ hrs}$	Nitrate + Nitrite as $N = 28$ days			Ja Villato	ma ogon as 1	5 1113			
N	NOTE: List sample	es that exceed hold time v	with # of days exceeded on checklist								
ACTION:		ding times are exceeded	qualify results (J). For water sample		/			ect results. Professional			
3	.0 Laborator	y Method		Yes 📗	No []	N/A [_]	Comments:				
3	.1 Was the correct	laboratory method used?									
ACTION:	If no, contact lab	to provide justification fo	or method change compared to the requ	nested method. Contact se	enior chemi	st to inform C	lient of change or t	o request variance.			

	3.2 Are the practical quantitation li  ☐ QAPP/IRSWP ☐ Lab?	mits the same as those specified by	the Yes No No	N/A [_] Co	omments:
	Note: The MADEP QA/QC Guidelines do therefore all criteria will default to values stip	not yet list PQLs for wet chemistry analys oulated in the QAPP*. Where the QAPP does It to limits employed by the lab**. Other crite	es, were analyzed at a peria nitrite.	1503, 00-5 dilution due	to cloride LL's we elever
	Ammonia* ☑ = 0.1 mg/ L	Alkalinity** $\square = 1 \text{ mg/L}$	Bicarbonate Alkalinity** □ =	= 1 mg/L	Carbonate Alkalinity** $\square = 1 \text{ mg/L}$
	Nitrate Nitrogen as N* □ = .05 mg/L	Nitrite Nitrogen as N* $\square = .01 \text{ mg/L}$ Total Organic Carbon** $\square = 1 \text{ mg/L}$	Chloride* ☑ = 1 mg/L		Hardness $*\Box = 2 \text{ mg/L}$
	Spec. Cond.** ☑ 3 umhos/cm	Total Organic Carbon** □ = 1 mg/L	Oil & Grease* $\square = 5.5 \text{ mg/}$	L	Sulfate (EPA 300.0)* □ = 2 mg/L
	COD:* Low – 20 mg/L	COD* High - 50 mg/L □	$TDS* \square = 10 \text{ mg/L}$		$TSS* \square = 5 \text{ mg/L}$
	$pH* \square < 2 \text{ to} > 12$	Phenolic - 0.01 mg/L			
	Other parameter(list)	_PQL=	ce of PQL =		
	Other parameter(list)	PQL =	ce of PQL =		
ACTIO	N: If no, evaluate change with respect to same	aple matrix, preparation, dilution, moisture, et			
	3.3 Are the appropriate parameter results pro	esent for each sample in the SDG?	Yes No No	N/A [_] Co	omments:
ACTIO	N: If no, check Request for Analysis to verify	if method was ordered and COC to verify the	nt it was sent, and contact lab f	or resubmission of	of the missing data
	3.4 If dilutions were required, were dilution f	actors reported?	Yes No No	N/A [] Co	omments:
ACTIO	N: If no, contact the lab for submission.				
4.0	Method Blanks		Yes No No	N/A [_] Co	omments:
	4.1 Are the Method Blank Summaries presen	nt?			
ACTIO	N: If no, call the laboratory for submission o	f missing data.			
	4.2 Was a method blank analyzed for each a 20 or less?	analysis batch of wet chemistry field samples	of Yes No No	N/A [_] Co	omments:

ACTIO	CTION: If no, document discrepancy in case narrative and contact lab for justification. Consult senior chemist for action needed.							
	4.3 Is th	ne method blank less than the PQL? (See Section 3.2 for PQLs).	Yes 🗹	No [_]	N/A [_]	Comments:		
				ă				
	4.4 Do a accordir	any method blanks have positive results for wet chemistry parameters? Qualify data ng to the following:	Yes []	No 🔝	N/A [_]	Comments:		
	If the sa PQL or	mple concentration is $< 5 \times$ blank value, flag sample result non-detect "U" at the the concentration reported if greater than the PQL.						
	If the sa	mple concentration is $> 5 \times$ blank value, no qualification is needed.						
ACTIC qualifier	ON: If an	by blank has positive results, list all the concentrations detected and flagging level (flagging level)	gging level =	= 5 × blank v	ralue) on the c	hecklist. List all affected samples and their		
5.0	Labora	tory Control Standards						
	5.1	Was a laboratory control standard (LCS) run with each analytical batch of 20 samples or less?	Yes [	No [_]	N/A []	Comments:		
ACTIO udgmer	N: If no nt to deter	o, call laboratory for LCS form submittal. If data is not available, use professional rmine qualification actions for data associated with the batch.	,	/				
	5.2	Is a LCS Summary Form present?	Yes [_]	No []	N/A []	Comments:		
ACTIO	N: If no,	contact lab for resubmission of missing data.						
	5.3	Is any wet chemistry analyte LCS recovery outside the control limits?	Yes []	No [_]	N/A []	Comments:		

#### LCS Limits:

LCS Limits:										
Total Org	= 80-120%   = 80-120%   = 80-120%   = 80-120%	Bicarbonate Alkalinity** □ = 80-120%  TDS** □ = 80-120%  COD High* □ = 80-120%  Chloride* □ = 80-120%	Oil & Grease* □ Nitrate Nitroge	The first state of the state o		Specific Conductivity * Ammonia Nitrogen as N Nitrite Nitrogen as N pH* □ = 98-102%	N* □ = 80-120%			
Other par	rameter(list)	%R =		☐ Rec Li	mits=					
		%R =								
		(MADEP has not yet defined LCS reco	very limits for wet o	chemistry and	alyses.)					
ACTION: If reco	<b>ACTION</b> : If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and no-detect results within the batch as (J). If LCS recovery is <10%, non-detect results are rejected (R).									
6.0 Matrix S	pikes									
Matrix spikes ma	ay be collected at different f es. Confirm spike requireme	requencies based on monthly, quarterly ents for each set with the senior chemist	, or task							
	Vere project-specific MS/MSDs ontact senior chemist to see if a	s analyzed? List project samples that were s any were specified.	piked. Yes [ <u>/</u> ]	No [_]	N/A []	Comments: OC-S W	-7218R			
	Is the MS/MSD Recovery Form contact lab for resubmission of		Yes [	No [_]	N/A []	Comments:				
6.3		at the required frequency of 1 per 20 sam	iples per	No[]	N/A [ ]	Comments:				
ACTION: If any	matrix spike data is missing, ca	ll lab for resubmission.	ت.		/	2012 750000 00 W				
			Yes []	No [_]	N/A []	Comments:				

	6.4 Are any wet chemi	istry analyte spike	e recoveries ou	tside of the QC limits?							
		SR = (SSR)		100%		When	re:	SSR =	Spiked SR	sample = Sample	resu
				SA = Spike added						-	
	MS/MSD Recovery Limits	<u>s:</u>							,		
	Alkalinity* = NA	/	Bicarbonate A	Alkalinity* = NA	Carbonate alkalinity	y* = NA	Ammonia	a* (LACH	AT) 🔯 = 75-	125%	
	Chloride*(SM 4500 Cl)	= 75-125%	Specific Cond	fluctivity * = NA	Total Organic Carb	on* = NA	TDS** =	= NA			
	Oil & Grease* = NA	/	COD Low*	□ = 75-125%	COD High* $\square = 75$	5-125%	Nitrate N	itrogen as	N** 🗹 = 75-	125%	
	Oil & Grease* = NA Nitrite Nitrogen as N**	= 75-125%	Hardness* □	= 75-125%	Sulfate (EPA 300.0	))* 🕡 = 75-125%	% pH* = N	ΙA	TSS* =	NA	
	Other parameter(list)			% R =		☐ Rec Lir	nits =				
MS/MS ACTIO	* = Laboratory Limits  NOTES: 1) If only one of t 2) If the MS/MSD  N: MS/MSD flags only appl positive results as estimated ( D recovery is < 30% and the s  N: Laboratory control limits d, but no flags are applied.  6.5 Are any RPDs for MS/M  NOTE: RPD = S - D (S + D)/2	the recoveries for D was performed by to the sample sq. (J). If the recover sample is non-det samply when spik	an MS/MSD poy the laborato piked. Do not ries of the MS tect, the results and sample resultside of the Q	pair is outside of the cory on a non-project same evaluate if sample con and MSD are lower that are considered unusabults fall within the nor A/QC limits?	aple, no qualification is centration is > 4X spike that the lower control less and flagged (R).  mal calibration range.	cation is necessar s required.  The recover limit but > 30%,	y. Use profices of the M qualify both	essional ju S and MSI positive r	D exceed the results and no	upper contr on-detects (J	ol limit
	MS/MSD RPD Limits: RPD $\leq 20$										
7.0	Laboratory Duplicate  Are the RPDs for the laborate	atory duplicates <	<20% unless o	therwise specified bel	ow? Yes	No [_] ]	N/A []	Commen	uts:		

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ACTIO	ON: If the RPD is great	er than specified limits, qualify all results for that	analyte as estimated (J	).					
	pH* □ = 3%	Specific Conductivity * 5%	$TSS^{**} \square = 6\%$			TDS** □ = 6%	6		
8.0	Sampling Accuracy								
The mwith d	najority of ground was	ter samples are collected directly from a tap se blanks will not be collected.	, process stream, or			/			
	8.1 Were rinsate blan associated samples from	nks collected? Prior to evaluating rinsate blank om the senior chemist.	s, obtain a list of the	Yes []	No [ ]	N/A [_]	Comments:		
	8.2 Do any rinsate bla	anks have positive results?		Yes []	No []	N/A []	Comments:		
ACTI	ON: Evaluate rinsate	results vs. blank results to determine if cont	aminant may be labo	ratorv-deriv	red. If not l	ab-related o	alify accordi	ng to the tab	e below
		tration is $< 5 \times$ blank value, flag sample result no							ie below.
	If the sample concent	tration is $> 5 \times$ blank value, no qualification is need	eded.						
NOTE	: MADEP does not re	equire the collection of rinsate blanks.							
9.0	Field Duplicates			,					
	9.1 Were field dup field duplicates.	plicate samples collected? Obtain a list of sample	es and their associated	Yes 🚺	No [_]	N/A []	Comments:	oc-su	1-PZ18R
		cates collected per the required frequency?		Yes [_]	No [_]	N/A []	Comments:		5
QA	PP/IRSWP □ MAD	DEP Option 1(1 per 20) 🗹 MADEP Option	3 (1 per 10) □						0 1
	9.3 Was the RPD $\leq$ 3 attach to this review	$0\%$ for waters $\leq 50\%$ for soils? Calculate the I w.	RPD for results and	Yes [1]	No [_]	N/A []	Comments:	SeeaH	word.

#### VALIDATION REPORT 360-37491-1 WET CHEM FIELD DUPLICATE RPD ASSESSMENT NOVEMBER 2011 OLIN SLURRY WALL CAP

Sample ID	Analyte	Orig	Q	DUP	Q	RPD
OC-SW-PZ18R Chloride		12	0	120		0
OC-SW-PZ18R	LAB SPECIFIC CONDUCTANCE	780		780		0
OC-SW-PZ18R	Nitrate as N	0.2		0.2		0
OC-SW-PZ18R	Nitrite as N	0.01 U		0.01 U		0
OC-SW-PZ18R	Nitrogen, as Ammonia	30		29		3.4
OC-SW-PZ18R	Sulfate	120		110		8.7

/MMulle 12/2/4

<b>ACTION</b> :. Qualify data (J) for both sample results if the RPD exceeded.		
Was any of the data qualified?	Yes [ ] No [ ] N/A [ ] Comments:	

If so, apply data qualifiers directly to the DQE copy of laboratory report and flag pages for entry in database.

#### REFERENCES:-

MACTEC, 2007. "Draft Interim Response Steps Work Plan"; Olin Chemical Superfund Site, 51 Eames Street, Wilmington, Massachusetts.; Project No. 6300-06-0010/41.1; July 25, 2007.

MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Compendium of Quality Control Requirements and Performance Standards for Selected Analytical Protocols," WSC-CAM #10-320, Final, Revision No. 1, 5 July 2010.

MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data in Support of Action Conducted Under the Massachusetts Contingency Plan (MCP)," WSC-CAM, Section VIIA, Final, Revision No. 1, 1 July 2010.

Version 1.3, Oct 2011

#### OLIN-WILMINGTON LEVEL I DATA QUALITY EVALUATION STANDARD OPERATING PROCEDURE AND CHECKLIST ICP METALS BY METHOD 6010B/200 7

Reviewer/Date Musella 18/11
Reviewel/Date /00000 Charles 13/1/
Sr. Review/Date Chris Chands 19112
Lab Report # 360 - 37491-1
Project # 6107 110016,12

	ICF METALS BY METHOD 0010B/200./	1		Project #_(	107 110016	12
total	ad dissolved aluminum sodium, chronium					ă.
1.0	<u>Laboratory Deliverable Requirements</u>					H
	1.1 Laboratory Information: Was all of the following provided in the laboratory report? Yes Check items received.  Name of Laboratory Address Project ID Phone # Client Information: Name Address Address Client Contact	Sample id	No 1 identification s must be c	N/A [] n – Field and cross-reference	Comments:  Laboratory  red)	
ACTIC	<b>ON</b> : If no, contact lab for submission of missing or illegible information.				E.	
	1.2 Laboratory Report Certification Statement Yes	es [] N	No [_]     I	N/A []	Comments:	
Does th	ne laboratory report include a completed Analytical Report Certification in the required form	mat?				ž.
ACTIO	N: If no, contact lab for submission of missing certification or certification with correct form	mat.	/			
	1.3 Laboratory Case Narrative:	es [	Vo [_] I	N/A []	Comments:	2
	Narrative serves as an exception report for the project and method QA/QC performs on the	nance.	□ Narra	ntive includes	s an explanation	of each discrepancy
				Certificatio	on Statement.	
ACTIO	N: If no, contact lab for submission of missing or illegible information.	1/	Ÿ			
	1.4 Chain of Custody (COC) copy present with all documentation completed Yes	es [] N	No [] 0	N/A [_]	Comments:	
	NOTE: Olin receives and maintains the <i>original COC</i> .					
ACTIO	N: If no, contact lab for submission of copy of completed COC.					

		Control of the Contro	AND DESCRIPTION OF THE PARTY OF		
1.5 Sample	Receipt Information (Cooler Receipt Form present?):	Yes 📘	No [_]	N/A []	Comments:
Were each of into the labor	of the following tasks completed and recorded upon receipt of the sample(s) ratory?				
☑ Sample temperature ☑ Container type note	e confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered ed 🗵 sample condition observed 🖾 pH verified (where applicable) 🖾 Field and	on the same	day as colle	ection, tempera	ature requirement does not apply).
ACTION: If no, cont	eact lab for submission of missing or incomplete documentation.				
1.5.1	Were all samples delivered to the laboratory without breakage?	Yes [_]	No []	N/A []	Comments:
1.5.2	Does the <i>Cooler Receipt Form</i> or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data?	Yes []	No [/	N/A [_]	Comments:
1.6 Sample laborate	Results Section: Was each of the following requirements supplied in the ry report for each sample?	Yes [_]	No []	N/A []	Comments:
Field ID and Lab Clean-up method Matrix	DID	☑ Dilution ☑ Date of paits (soils mus	Factor preparation/ st be reporte	extraction/dig	moisture or solids Reporting limits estion clean-up and analysis, where applicable nt)
1.7 QA/QC	tact lab for submission of missing or incomplete information.  2 Information: Was each of the following information supplied in the port for each sample batch?	Yes [	No [_]	N/A []	Comments:

6010

		/		ALS BY WETHO	D 6010B/200./		
☐ Meth	od blank results	LCS recoverie	s 🗹 MS/MSD recoveries and F	RPDs 🗖 Laborator	y duplicate results (where	applicable)	
ACTION	N: If no, contact	lab for submission o	f missing or incomplete information	on.			
2.0	Holding Time	<u>s</u>					
	y technical hold exceeded? Hold water and soil.	ling times, determin	ed from date of collection to da is 180 days from sample collection	ate of analysis, been on to analysis for both	Yes No No	N/A _]	Comments:
NOTE: 1	List samples that	exceed hold time w	ith # of days exceeded on checklis	st			
ACTION	N: If technical (UJ). If grossly	holding times are ex exceeded (2X holdin	ceeded, qualify all positive result ng time) reject (R) all non-detect r	s (J) and non-detects esults.	3		
3.0	Laboratory N	<u>Iethod</u>					
	3.1 Was t	he correct laborato	ry method used?		Yes No No	N/A []	Comments:
		Digestion Digestion S	3005A or 3010A or 3020A 3050B 6010B or 200.7				
compa	ON: If no, ared to the request variar	uested method. Co	to provide justification for ontact senior chemist to inform	or method change in Client of change			
	3.2 Are t	he practical quanti SOW 🖸 QAPI	tation limits the same as thos	se specified by the	e Yes No No	N/A []	Comments:
NOTE	E: Verify that the	reported metals mat	ch the target list specified on the (	COC.			

6010

AC'	ΓΙΟΝ: sture, e	If no, evaluate variation with respect to sample matrix, preparation, dilution, tc. If sample PQL is indeterminate, contact lab for explanation.				
	3.3	Are results present for each sample in the SDG?	Yes 🗾	No [_]	N/A []	Comments:
ACTIO	ON: If n	to, check Request for Analysis to verify if method was ordered and COC to verify that it		/		ssion of the miss
	3.4	If dilutions were required, were dilution factors reported?	Yes [	No [_]	N/A []	Comments:
ACTIO	ON: If n	to, contact the lab for submission.				
4.0	Metl	nod Blanks				
	4.1	Is the Method Blank Summary present?	Yes 🗾	/ No []	N/A [_]	Comments:
AC.	ΓΙΟΝ:	If no, call the laboratory for submission of missing data.				
	4.2	Frequency of Analysis: Was a method blank analyzed for each digestion batch of < 20 field samples?	Yes 🔝	No [_]	N/A []	Comments:
		If no, contact laboratory for justification. Consult senior chemist for action rrate non-compliance.				
	4.3	Is the method blank less than the PQLs for all target elements?	Ves I	No. 1	Ν/ΔΓ 1	Comments:
NO's	TE: MA	ADEP requires the method blank to be matrix matched and digested with the				
	4.4 the fo	Do any method blanks have positive results for metals? Qualify data according to sllowing:	Yes [ /	No [_]	N/A [_]	Comments:
		Total sodium (391 mg/L) was reported in the nettool blan was established at finetimes the rejorted blank comentation	ll u vori	tel wit	has absot	- of myles
6010					ictul sur,	le results
		greater from the artin level. No feed tratem very	2011 Revision	ns\6010.doc		

Client: Olin Corporation

Project/Site: Olin Chemical Surfacewater

Method: 6010B - Total Metals

Lab Sample ID: MB 360-83100/1-A

Matrix: Water

Analysis Batch: 83303

Client San	ple ID:	Meth	od	Blanl	K
	Prep 7	Гуре:	To	tal/N/	4

Prep Batch: 83100

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		100	13	ug/L		11/09/11 11:49	11/11/11 17:48	1
Chromium	ND		5.0	0.65	ug/L		11/09/11 11:49	11/11/11 17:48	1
Sodium	ND		2000	280	ug/L		11/09/11 11:49	11/11/11 17:48	1

Lab Sample ID: LCS 360-83100/2-A

Matrix: V	water	
Analysis	s Batch: 83303	

	Spike
Analyte	Added
Aluminum	5000
Chromium	1000

Sodium	2
=- 	
Lab Cample ID: LCCD 260 92400/2 A	

Lab Sample ID: LCSD 360-83100/3-A Matrix: Water Analysis Batch: 83303

Allalysis	Dateii.	03303	

Analy	/te	
Alumi	inum	
Chror	mium	

Sodium

Lab Sample ID: 360-37491-6MS Matrix: Water

Analysis Batch: 83303

ı	/ damman
ı	Chromium
ı	Sodium

Lab Sample ID: 360-37491-6MSD

Matrix: Water Analysis Batch: 83303

Alla	lyte	
Alun	ninum	
1000	75.5	

Lab Sample ID: MB 360-83163/1-A Matrix: Water

Analysis Batch: 83365

Matrix: Water							Prep Type: Total/NA
Analysis Batch: 83303							Prep Batch: 83100
	Spike	LCS	LCS				%Rec.
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits
Aluminum	5000	5620		ug/L		112	80 - 120
Chromium	1000	1120		ug/L		112	80 - 120
Sodium	20000	20000		ug/L		100	80 - 120
=- =						/	

MB MB

Client Sample ID: Lab Control Sample Dup

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 83100

Spike	LCSD	LCSD				%Rec.		RPD
Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
5000	5820		ug/L		116	80 - 120	4	20
1000	1150		ug/L		115	80 - 120	3	20
20000	21400		ug/L		107	80 - 120	7	20
					1		East of Street	

Client Sample ID: OC-SW-PZ18R

Prep Type: Total/NA

Prep Batch: 83100

	Sample	Sample	Spike	MS	MS				%Rec.	
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Aluminum	270		5000	6080		ug/L		116	75 - 125	
Chromium	22		1000	1170		ug/L		115	75 - 125	
Sodium	88000		20000	107000	4	ug/L		90	75 - 125	

Client Sample ID: OC-SW-PZ18R

Prep Type: Total/NA

Prep Batch: 83100

	Sample	Sample	Spike	MSD	MSD				%Rec.		RPD
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Aluminum	270		5000	5940		ug/L		113	75 - 125	2	20
Chromium	22		1000	1140		ug/L		111	75 - 125	3	20
Sodium	88000		20000	105000	4	ug/L		84	75 - 125	1/	20

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 83163

	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		100	13	ug/L		11/10/11 08:48	11/14/11 14:28	1
Chromium	ND		5.0	0.65	ug/L		11/10/11 08:48	11/14/11 14:28	1
Sodium	391	J	2000	280	ug/L		11/10/11 08:48	11/14/11 14:28	1

If the sample concentration is < 5  $\times$  blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is  $> 5 \times$  blank value, no qualification is needed.

**ACTION:** For any blank with positive results, list all contaminants for each method blank including the concentration detected and the flagging level (flagging level = 5x the blank value) and the associated samples and qualifiers.

.0	Labor	atory Control Standard				
	5.1	Was a laboratory control standard run with each analytical batch of 20 samples or less?	Yes 🗾	No [_]	N/A []	Comments:
ACT	ION:	Itarget, second source LCS is required by MADEP. Call laboratory for LCS form submittal. If data are not available, use judgement to evaluate data accuracy associated with that batch.				
ACT	5.2 TON: I	Is a LCS Summary Form present?  f no, contact lab for resubmission of missing data.	Yes 🗾	No [_]	N/A []	Comments:
ACT within non-	Sample Water Soil TION: n the balletects r	Is the recovery of any analyte outside of MADEP control limits?  MADEP  Type % Rec	Yes [_]	No 🗾	N/A [_]	Comments:

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Comments:

#### 6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs collected? List project samples that were spiked.

Yes No NA Comments: OC-SW-PZIBR

ACTION: If no, contact senior chemist to see if any were specified.

6.2 Is the Matrix Spike/Matrix Spike Duplicate Recovery Form present?

Yes No NA Comments:

NOTE: A <u>full</u> target, second source MS/MSD is required by MADEP.

ACTION: If any matrix spike data are missing, call lab for resubmission.

6.3 Were matrix spikes analyzed as indicated on the COC and project schedule?

Yes No No NA Comments:

**ACTION**: If any matrix spike data are missing, call lab for resubmission. If none, no qualification is needed. Narrate non-compliance.

6.4 Are any metal spike recoveries outside of the QC limits?

Yes []	No [	N/A [_	]	Comments:

	MADEP	QAPP	
Sample Type	% Rec	% Rec	Method
Water	75-125	N/A	6010B
Water	N/A	70-130	200.7
Soil	75-125	75-125	6010B

NOTE: 
$$%R = (SSR-SR) \times 100\%$$
 Where:  $SSR = Spiked sample result SR = Sample result$ 

**NOTE:** If dilutions are required due to high sample concentrations (> 4X spike), the data are evaluated, but no flags are applied.

NOTE: If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags. ACTION: MS/MSD flags only apply to the sample spiked. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit, qualify positive results and non-detects (J). Are any RPDs for MS/MSD recoveries outside of the QC limits? 6.5 **NOTE**: RPD = S-D x 100% Where: S = MS sample result D = MSD sample result (S+D)/2NOTE: If dilutions are required due to high sample concentrations, the data are evaluated, but no flags are applied. ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects (J).Laboratory Duplicate 7.0 7.1 Was a laboratory duplicate sample analyzed? If so, is the Laboratory Yes [\_] No [/] Duplicate Sample Form present? NOTE: MADEP refers to this sample as a "matrix duplicate". ACTION: If not analyzed, qualification is not needed. If data is missing, contact laboratory for resubmission of report. Narrate non-compliance. 7.2 Is the RPD between the result for the laboratory duplicate sample and the result for the parent sample outside of the QA/QC limits?

MADEP Laboratory Duplicate Sample RPD Criteria:	QAPP RPD
For aqueous results > $5 \times$ RL, RPD must be $\pm 20\%$	20
For aqueous results $< 5 \times RL$ , RPD must be $\leq RL$	20
For soil/sediment results > $5 \times RL$ , RPD must be $\pm 35\%$	20
For soil/sediment results $< 5 \times RL$ , RPD must be $\le 2 \times RL$	20

**ACTION**: If the RPD exceeds the limits, qualify both positive results and non-detects as estimated and flag them J. Narrate non-compliance

#### 8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

- 8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist.
- 8.2 Do any rinsate blanks have positive results?

NOTE: MADEP does not require the collection of rinsate blanks.

**ACTION:** Evaluate rinsate results against blank results to determine if contaminant may be laboratory-derived. If results are not lab-related, qualify according to below.

If the sample concentration is  $< 5 \times$  blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is  $> 5 \times$  blank value, no qualification is needed.

#### 9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates.



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9.2 Were field duplicates collected per the required frequency?	Yes No No N/A Comments:
SOW ☐ QAPP (1 per 10) ☐ MADEP Option 1 (1 per 20) ☐ MADEP Option 3 (1 per 10) ☐	
9.3 Was the RPD $\leq$ 50% for soils or waters? Calculate the RPD for all results and attach to this review.	Yes [ No [ N/A [ Comments: See attach!
<b>ACTION</b> : RPD must be ≤50% for soil and water. Qualify data (J) for both sample results it	f the RPD exceeds 50%.
10.0 Special QA/QC	
<ul> <li>10.1 Were both total and dissolved metals analysis performed? If so, the dissolved metal concentration should not exceed that of the total metal.</li> <li>ACTION: If results for both total and dissolved are ≥ 5x the PQL and the dissolved concentration is 10% higher than the total, flag both results as estimated (J). If total and dissolved concentrations are less than 5x the PQL and the difference exceeds 2x the PQL, flag both results as estimated (J)</li> </ul>	Yes [ No [ N/A [ Comments:  It subset of a sodium results were greater than  1020 about total sodium results. Total and  licional codium results in sayles:  OC-SW-15COZ  OC-SW-PZIGER  OC-SW-PZIGER  OC-SW-PZIGER  OC-SW-PZIGER  OC-SW-PZIGER  OC-SW-DIT  Were gentitud estimated (5) (TO).  See attall
	Secattul

# VALIDATION REPORT 360-37491-1 METALS FIELD DUPLICATE RPD ASSESSMENT NOVEMBER 2011 OLIN SLURRY WALL CAP

Sample ID	Analyte	Orig	Q	DUP	Q	RPD	
OC-SW-PZ18R D	Aluminum	170	)	180		5.7	
OC-SW-PZ18R D	Chromium	14		1:	15		
OC-SW-PZ18R D	Sodium	96000	)	96000	6.9		
OC-SW-PZ18R T	Aluminum	270		260	3.8		
OC-SW-PZ18R T	Chromium	22		2	1	4.7	
OC-SW-PZ18R T	Sodium	88000		83000	5.8		

Marsh 12/7/11

T	360-37491 OC-SW-ISCO1	Sodium	89000	
D	360-37491 OC-SW-ISCO1	Sodium	98000	10
T	360-37491 OC-SW-ISCO2	Sodium	84000	
D	360-37491 OC-SW-ISCO2	Sodium	100000	19
T	360-37491 OC-SW-ISCO3	Sodium	93000	
D	360-37491 OC-SW-ISCO3	Sodium	100000	8
T	360-37491 OC-SW-PZ16RR	Sodium	110000	
D	360-37491 OC-SW-PZ16RR	Sodium	130000	18
T	360-37491 OC-SW-PZ17RR	Sodium	120000	
D	360-37491 OC-SW-PZ17RR	Sodium	140000	17
T	360-37491 OC-SW-PZ18R	Sodium	88000	
D	360-37491 OC-SW-PZ18R	Sodium	96000	9
T	360-37491 OC-SW-PZ18R-DUP	Sodium	83000	
D	360-37491 OC-SW-PZ18R-DUP	Sodium	96000	16
T	360-37491 OC-SW-SD17	Sodium	120000	
D	360-37491 OC-SW-SD17	Sodium	140000	17

JUMM///2/11

Client: Olin Corporation

Project/Site: Olin Chemical Surfacewater

#### Method: 6010B - Dissolved Metals - Dissolved

Client Sample ID: OC-SW-ISC01 Date Collected: 11/08/11 12:45

Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-1

Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	150		100	13	ug/L			11/15/11 17:05	1
Chromium	13		5.0	0.65	ug/L			11/15/11 17:05	1
Sodium	98000		2000	280	ug/L			11/15/11 17:05	. 1

Client Sample ID: OC-SW-ISC02 Date Collected: 11/08/11 11:45 Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-2

Matrix: Water

Analyte Result Qualifier RL MDL Unit D Prepared Dil Fac Analyzed Aluminum 130 100 13 ug/L 11/15/11 17:08 Chromium 27 5.0 0.65 ug/L 11/15/11 17:08 Sodium 100000 2000 280 ug/L 11/15/11 17:08

Client Sample ID: OC-SW-ISC03 Date Collected: 11/08/11 11:30 Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-3

Matrix: Water

Analyte Result Qualifier RL MDL Unit Prepared Analyzed Dil Fac Aluminum 28 100 13 ug/L 11/15/11 17:11 Chromium ND 5.0 0.65 ug/L 11/15/11 17:11 100000 2000 280 ug/L Sodium 11/15/11 17:11

Client Sample ID: OC-SW-PZ16RR Date Collected: 11/08/11 11:55 Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-4

Matrix: Water

Result Qualifier Analyte MDL Unit RL Prepared Analyzed Dil Fac 100 13 ug/L Aluminum 69 J 11/15/11 17:18 Chromium 5.0 23 0.65 ug/L 11/15/11 17:18 1 Sodium 130000 2000 280 ug/L 11/15/11 17:18

Client Sample ID: OC-SW-PZ17RR Date Collected: 11/08/11 12:10 Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-5

Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	110		100	13	ug/L			11/15/11 17:21	1
Chromium	55		5.0	0.65	ug/L			11/15/11 17:21	1
Sodium	140000	7	2000	280	ug/L			11/15/11 17:21	1

Client Sample ID: OC-SW-PZ18R Date Collected: 11/08/11 12:30 Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-6

Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	170	, <del></del> ,	100	13	ug/L			11/15/11 16:47	1
Chromium	14		5.0	0.65	ug/L			11/15/11 16:47	1
Sodium	96000		2000	280	ug/L			11/15/11 16:47	1

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TestAmerica Westfield 11/28/2011

12/7/4

TestAmerica Job ID: 360-37491-1

#### Method: 6010B - Dissolved Metals - Dissolved

Client Sample ID: OC-SW-SD17 Date Collected: 11/08/11 12:20 Date Received: 11/08/11 17:10

Client Sample ID: OC-SW-PZ18R-DUP

Date Collected: 11/08/11 12:30

Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-7

Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1900		100	13	ug/L			11/15/11 17:24	1
Chromium	370		5.0	0.65	ug/L			11/15/11 17:24	1
Sodium	140000	7	2000	280	ug/L			11/15/11 17:24	1

Lab Sample ID: 360-37491-8

Matrix: Water

Analyte Re	sult (	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	180		100	13	ug/L			11/15/11 17:26	1
Chromium	15		5.0	0.65	ug/L			11/15/11 17:26	1
Sodium 96	000	7	2000	280	ug/L			11/15/11 17:26	1

Client: Olin Corporation

Project/Site: Olin Chemical Surfacewater

Method: 6010B - Total Metals

Client Sample ID: OC-SW-ISC01

Date Collected: 11/08/11 12:45

Date Received: 11/08/11 17:10

Date Received: 11/08/11 17:10

Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-1

Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	330		100	13	ug/L		11/09/11 11:49	11/11/11 18:17	1
Chromium	30		5.0	0.65	ug/L		11/09/11 11:49	11/11/11 18:17	1
Sodium	89000		2000	280	ug/L		11/09/11 11:49	11/11/11 18:17	1

Client Sample ID: OC-SW-ISC02 Lab Sample ID: 360-37491-2 Date Collected: 11/08/11 11:45

Matrix: Water

Analyte Resul	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum 4000		100	13	ug/L		11/09/11 11:49	11/11/11 18:20	1
Chromium 750		5.0	0.65	ug/L		11/09/11 11:49	11/11/11 18:20	1
Sodium 84000	ゴ	2000	280	ug/L		11/09/11 11:49	11/11/11 18:20	1

Client Sample ID: OC-SW-ISC03 Lab Sample ID: 360-37491-3 Date Collected: 11/08/11 11:30

Matrix: Water

Analyzed

Dil Fac

	Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Aluminum	200		100	13	ug/L		11/09/11 11:49	11/11/11 18:23	1
1	Chromium	2.0	J	5.0	0.65	ug/L		11/09/11 11:49	11/11/11 18:23	1
	Sodium	93000		2000	280	ug/L		11/09/11 11:49	11/11/11 18:23	1

Client Sample ID: OC-SW-PZ16RR Lab Sample ID: 360-37491-4 Date Collected: 11/08/11 11:55 Matrix: Water

Date Received: 11/08/11 17:10

Analyte Result Qualifier RL MDL Unit Prepared

Aluminum 1800 100 13 ug/L 11/09/11 11:49 11/11/11 18:26 5.0 Chromium 380 0.65 ug/L 11/09/11 11:49 11/11/11 18:26 110000 丁 2000 280 ug/L 11/09/11 11:49 11/11/11 18:26 Sodium

Client Sample ID: OC-SW-PZ17RR Lab Sample ID: 360-37491-5 Date Collected: 11/08/11 12:10 Matrix: Water

Date Received: 11/08/11 17:10 Analyte Result Qualifier RL MDL Unit Prepared Dil Fac Analyzed

100 Aluminum 2000 13 ug/L 11/09/11 11:49 11/11/11 18:29 Chromium 470 5.0 0.65 ug/L 11/09/11 11:49 11/11/11 18:29 2000 Sodium 120000 280 ug/L 11/09/11 11:49 11/11/11 18:29

Client Sample ID: OC-SW-PZ18R Lab Sample ID: 360-37491-6 Date Collected: 11/08/11 12:30 Matrix: Water

Date Received: 11/08/11 17:10

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	270		100	13	ug/L		11/09/11 11:49	11/11/11 17:57	1
Chromium	22		5.0	0.65	ug/L		11/09/11 11:49	11/11/11 17:57	1
Sodium	88000		2000	280	ug/L		11/09/11 11:49	11/11/11 17:57	1

12/4/11

Client: Olin Corporation

Project/Site: Olin Chemical Surfacewater

TestAmerica Job ID: 360-37491-1

Method: 6010B - Total Metals

Client Sample ID: OC-SW-SD17 Date Collected: 11/08/11 12:20

Lab Sample ID: 360-37491-7

Matrix: Water

Date Received: 11/08/11 17:10

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	2100	3	100	13	ug/L		11/10/11 08:48	11/14/11 15:00	1
Chromium	470		5.0	0.65	ug/L		11/10/11 08:48	11/14/11 15:00	1
Sodium	120000	,B	2000	280	ug/L		11/10/11 08:48	11/14/11 15:00	1

Lab Sample ID: 360-37491-8

Matrix: Water

Date Collected: 11/08/11 12:30 Date Received: 11/08/11 17:10

Client Sample ID: OC-SW-PZ18R-DUP

Ì	Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Aluminum	260		100	13	ug/L		11/10/11 08:48	11/14/11 14:52	1
	Chromium	21		5.0	0.65	ug/L		11/10/11 08:48	11/14/11 14:52	1
	Sodium	83000	,B	2000	280	ug/L		11/10/11 08:48	11/14/11 14:52	1

10.0	Application	of	Validation	<b>Oualifiers</b>

Was any of the data qualified?

/				
Yes [	No []	N/A [	_]	Comments:

If so, apply data qualifiers directly to the DQE copy of laboratory report and flag pages for entry in database.

#### REFERENCES

- LAW, 1999, "Final Quality Assurance Project Plan, Olin Wilmington Property, 51 Eames Street, Wilmington, MA", LAW Engineering and Environmental Services, Kennesaw, GA 30144. August 1999
- U.S. Environmental Protection Agency (USEPA), 1989. "Region 1 Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses"; Hazardous Site Evaluation Division; February 1989.
- MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Compendium of Quality Control Requirements and Performance Standards for Selected Analytical Protocols," WSC-CAM #10-320, Final, Revision No. 1, 1 July 2010.
- MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data in Support of Action Conducted Under the Massachusetts Contingency Plan (MCP)," WSC-CAM, Section VIIA, Final, Revision No. 1, 1 July 2010.
- MADEP, 2010. "Quality Control Requirements and Performance Standards for the Analysis of Trace Metals by Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES) in Support of Response Actions under the Massachusetts Contingency Plan (MCP)" WSC-CAM, Final, Revision No. 1, 5 July 2010.

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Version 1.3, Oct 2011

#### OLIN-WILMINGTON LEVEL I DATA QUALITY EVALUATION STANDARD OPERATING PROCEDURE AND CHECKLIST ICP METALS BY METHOD 6010B/200,7

Reviewer/Date Munch	12	1910
Sr. Review/Date Chys Ricardil	14	117/
Lab Report # 360-37595-/		
Project # 6107 110016,12	-	

	50- 2000 (March 2007)		I Toject #_	010 1110010	12
tota	I aluminum, Chronium, jan.				
1.0	<u>Laboratory Deliverable Requirements</u>				
	1.1 Laboratory Information: Was all of the following provided in the laboratory report?  Check items received.  Name of Laboratory  Address  Project ID  Phone #  Client Information:  Name				
ACTIC	N: If no, contact lab for submission of missing or illegible information.			v.	
	1.2 Laboratory Report Certification Statement	Yes [_] No [_]	N/A []	Comments:	
Does th	e laboratory report include a completed Analytical Report Certification in the required	format?			
ACTIO	N: If no, contact lab for submission of missing certification or certification with correct	format.			
	1.3 Laboratory Case Narrative:	Yes [	N/A []	Comments:	v
	Narrative serves as an exception report for the project and method QA/QC perforn the	ormance. 🏻 🗇 Narra	ative include	s an explanation	of each discrepancy
			Certificati	on Statement.	
ACTIOI	N: If no, contact lab for submission of missing or illegible information.	/ .			
	1.4 Chain of Custody (COC) copy present with all documentation completed	Yes No No	N/A []	Comments:	
	NOTE: Olin receives and maintains the original COC.				
ACTIO	N: If no, contact lab for submission of copy of completed COC.				

	1.5 Sample	Receip	ot Inform	ation (Co	oler Rece	eipt Form	present?):		Yes [	No [_]	N/A [ ]	Comments:
	Were each of into the labor	of the f ratory?	ollowing	tasks com	pleted and	recorded	ipon receipt o	f the sample(s)				
Sam	ple temperatur	e confined	rmed: mus	t be 1° – 1 dition obs	0° C. (If s	amples wer	e sent by couri	er and delivered	on the same	day as colle oss referenc	ection, tempera	ature requirement does not apply).
ACTIO	N: If no, con	tact lab	for subm	ssion of m	nissing or i	ncomplete	locumentation					
	1.5.1	Wer	e all samp	les deliver	ed to the la	aboratory w	rithout breakag	e?	Yes [	No [_]	N/A []	Comments:
	1.5.2	circi	ımstances	affecting i	the quality	of the data	,	other problems blems or special			N/A [_]	Comments:
	1.6 Sample laborate	e Resu ory repo	Its Section	n: Was e n sample?	ach of the	e following	requirements	supplied in the	Yes [	No [_]	N/A []	Comments:
☑ 1916 ☑ Cle ☑ Mat	eld ID and Lat an-up method trix	o ID	A Targ	ate and tii nalysis me et analytes	me collecte ethod and conce	ed entrations	□ Anglyst In	nitials tion method Un	Dilution Date of pairs (soils mus	Factor oreparation/ st be reporte	/extraction/dige	moisture or solids Reporting limitestion clean-up and analysis, where applicable)
ACTI	ON: If no, con	ntact lal	o for subm	ission of r	nissing or	incomplete	information.			/		
	1.7 QA/QC laboratory re	C Inforceport fo	rmation: r each san	Was each	h of the?	following	information s	upplied in the	Yes [_]	No []	N/A [_]	Comments:

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			/					A				
Met Met	hod blank	results	LCS recov	eries	MS/MSD	recoveries and	RPDs	Laboratory	duplicate res	sults (where	applicable)	
ACTIO	N: If no,	contact la	b for submission	on of r	missing or incon	nplete informat	tion.					
2.0	Holding	Times						9			/	
Have a	ny technic exceeded water an	d? Holdir	g times, deterng time for met	mined tals is	from date of 180 days from s	collection to d	date of an	nalysis, been lysis for both	Yes []	No [	N/A]	Comments:
NOTE:	List samp	oles that ex	xceed hold time	e with	# of days excee	eded on checkli	ist					
ACTIC	ON: If tec (UJ). If	hnical hogrossly ex	lding times are sceeded (2X ho	e exce	eded, qualify al time) reject (R)	l positive resul all non-detect	lts (J) and results.	d non-detects				3
3.0	Labora	itory Me	thod									
	3.1	Was the	correct labor	atory	method used?	,			Yes []	No []	N/A []	Comments:
		Water D Soil Dig Metals	Digestion gestion	30	005A or 3010 050B 010B or 200.7			30				
comp	CION: If pared to request	the reque	ested method.	tory . Con	to provide ju tact senior cho	ustification f emist to infor	for meth rm Clien	nod change at of change	a			
	3.2	Are the □ SC	practical qua	antitat APP	ion limits the □ Lab □	same as the	ose speci	ified by the	Yes [ ]	No []	N/A []	Comments:
NOT	E: Verify	that the re	ported metals	match	the target list s	pecified on the	COC.					

6010

ACT mois	TION: ture, e	If no, evaluate variation with respect to sample matrix, preparation, dilution, tc. If sample PQL is indeterminate, contact lab for explanation.				
	3.3	Are results present for each sample in the SDG?	Yes [	No []	N/A []	Comments:
ACTIC	N: If n	o, check Request for Analysis to verify if method was ordered and COC to verify that it	t was sent, a	nd contact la	nb for resubmi	ssion of the missing data
	3.4	If dilutions were required, were dilution factors reported?	Yes []	No []	N/A []	Comments:
ACTIC	N: If n	o, contact the lab for submission.				
		, ,				
4.0	Metl	nod Blanks				
	4.1	Is the Method Blank Summary present?	Yes []	No []	N/A []	Comments:
ACT	TION:	If no, call the laboratory for submission of missing data.		<i>(</i>		
	4.2	Frequency of Analysis: Was a method blank analyzed for each digestion batch of < 20 field samples?	Yes [	No []	N/A []	Comments:
ACT need	T <b>ION</b> : ed. Na	If no, contact laboratory for justification. Consult senior chemist for action rrate non-compliance.			21	
	4.3	Is the method blank less than the PQLs for all target elements?	/			
NOT sam	E: MA	ADEP requires the method blank to be matrix matched and digested with the	Yes [✓]	No []	N/A []	Comments:
	4.4 the fo	Do any method blanks have positive results for metals? Qualify data according to ollowing:	Yes [	No []	N/A []	Comments:
6010	In	en (10 mg/kg and 1.75 mg/kg) was reported in the method by abblished at 5x the blank concentrations. Iron results in	lerks as	iourthal when	with all greater +	I saylis. Afon
	feral Alus	tablished at 5x tu blank concentrations. Iron results in fraction was regard.  P:\Projects\olinwilm\Data Validation\DV checklists\2  ninum (6.36 g/g) was reported in the method blank associated with a	2011 Revision	is/6010.doc	for bute	stallable at 5x blen

Client Sample ID: Method Blank

11/18/11 11:57

Client: Olin Corporation Project/Site: Olin Chemical

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 360-83454/1-A

Matrix: Solid

Analyte

Aluminum

Chromium

Iron

Iron

Iron

Analysis Batch: 83608

MB	MB
IVID	IVID

Result Qualifier 6.36 J ND

RL 7.5

MDL Unit 1.1 mg/Kg 0.50 0.25 mg/Kg 16.0 J 18 0.94 mg/Kg

Spike

Added

7740

272

13100

13100

Spike

Added

417

83.3

417

Prep Type: Total/NA Prep Batch: 83454

Client Sample ID: Lab Control Sample Dup

Analyzed Dil Fac 11/18/11 11:57 11/18/11 11:57

Prep Type: Total/NA

Prep Batch: 83454

RPD

0

RPD

Limit

30

30

30

LCDSRM LCDSRM

LCSSRM LCSSRM

MS MS

10600 4

15900 4

139

Result Qualifier

MDL Unit

0.25 mg/Kg

0.94 mg/Kg

mg/Kg

Qualifier

13000

20400

Result

13200

20200

243

242

Result Qualifier

Unit

mg/Kg

mg/Kg

mg/Kg

Lab Sample ID: LCDSRM 360-83454/3-A LCDSRM

Matrix: Solid

Analysis Ratch: 92609

Allalysis Batch. 63006		
Analyte		
Aluminum		
Chromium		

Lab Sample ID: LCSSRM 360-83454/2-A

Matrix: Solid

Analysis Batch: 83608

	Spike
Analyte	Added
Aluminum	7740
Chromium	272

Sample Sample

9700 B

35

14000 B

Result Qualifier

Lab Sample ID: 360-37595-3 MS

Matrix: Solid

Aluminum

Chromium

Analysis	batch:	03000	
Analyte			

Iron			

Lab Sample ID: 360-37595-3 MSD Matrix: Solid

Analysis Batch: 83608

Iron						
Lab	Cample	ın.	MD	260	02674/4	Λ

Lab Sample ID: MB 360-83671/1-A

Matrix: Solid

Analysis Batch: 83721

Analyte	Result	Qualifier
Aluminum	ND	
Chromium	ND	
Iron	1.75	J

MB MB

Prepared

11/16/11 12:50

11/16/11 12:50

11/16/11 12:50

%Rec

169

156)

Client Sample ID: Lab Control Sample Prep Type: Total/NA

Limits

89.9 - 279

68.0 - 124

68.6 - 239

Prep Batch: 83454

%Rec. Unit %Rec Limits mg/Kg 170 89.9 - 279 89 68.0 - 124 mg/Kg mg/Kg 68.6 - 239

Client Sample ID: OC-SD-SD3-0.0/0.5

Prep Type: Total/NA

Prep Batch: 83454 %Rec.

Unit	D	%Rec	Limits	
mg/Kg	Ø	224	75 - 125	-
mg/Kg	Ü	125	75 - 125	
mg/Kg	₽	494	75 - 125	

Prepared

Client Sample ID: OC-SD-SD3-0.0/0.5

Prep Type: Total/NA

Prep Batch: 83454

	Sample	Sample	Spike	MSD	MSD				%Rec.		RPD
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Aluminum	9700	В	422	10000	4	mg/Kg	华	79	75 - 125	6	35
Chromium	35		84.3	130		mg/Kg	菜	113	75 - 125	7	35
Iron	14000	В	422	13300	4	mg/Kg	章	-124	75 - 125	18	35
								1	/		

RL

7.5

0.50

18

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 83671

Prepared	Analyzed	Dil Fac
11/21/11 10:33	11/21/11 17:20	1
11/21/11 10:33	11/21/11 17:20	1
11/21/11 10:33	11/21/11 17:20	1

If the sample concentration is $< 5 \times$ blank value,	flag sample result non-detect "U" at the
PQL or the concentration reported if greater than	n the PQL.

If the sample concentration is  $> 5 \times$  blank value, no qualification is needed.

**ACTION:** For any blank with positive results, list all contaminants for each method blank including the concentration detected and the flagging level (flagging level = 5x the blank value) and the associated samples and qualifiers.

5.0	Laboratory	Control	Standard

5.1	Was a laboratory control standard run with each analytical batch of 20 samples or less?	Yes No N/A	Comments:
ACTION:	Il target, second source LCS is required by MADEP. Call laboratory for LCS form submittal. If data are not available, use judgement to evaluate data accuracy associated with that batch.		
5.2	Is a LCS Summary Form present?	Yes No N/A	Comments:
ACTION: I	f no, contact lab for resubmission of missing data.		
5.3 Sample Water	Is the recovery of any analyte outside of MADEP control limits?  MADEP  e Type % Rec  80-120	Yes No No N/A	
Soil	within Lab generated limits  If recovery is above the upper limit, qualify all positive sample results atch as (J). If recovery is below the lower limit, qualify all positive and results within the batch as (I). If I CS recovery is 200%	LC3/CCSD percent recoveries	of aluminum (17)
ACTION:	If recovery is above the upper limit, qualify all positive sample results	and iron (154,156, 167,0	and 174) exceeded the upper al
non-detects i	atch as (J). If recovery is below the lower limit, qualify all positive and results within the batch as (J). If LCS recovery is <30%, positive and non-	limit of 120. Alum	irum and iron results were
letect results	atch as (J). If recovery is below the lower limit, qualify all positive and results within the batch as (J). If LCS recovery is <30%, positive and non-s are rejected (R).	Y	

6010

Comments:

Lab Sample ID: 360-37595-1

Lab Sample ID: 360-37595-2

Lab Sample ID: 360-37595-3

Lab Sample ID: 360-37595-4

Lab Sample ID: 360-37595-5

11/18/11 12:32

Matrix: Solid

Matrix: Solid Percent Solids: 75.0

Matrix: Solid

Matrix: Solid

Matrix: Solid

Percent Solids: 74.2

Percent Solids: 72.3

Percent Solids: 71.5

Method: 6010B - Metals (ICP)

Date Received: 11/11/11 17:25

Client Sample ID: OC-SD-SD1-0.0/0.5 Date Collected: 11/11/11 12:35

Analyte Result Qualifier RL MDL Unit Prepared Analyzed Dil Fac Aluminum 11000 В 13 1.8 mg/Kg 11/16/11 12:50 11/18/11 12:26 0.84 0.42 mg/Kg 11/16/11 12:50 11/18/11 12:26 Chromium 30 13000 B 30 1.6 mg/Kg 11/16/11 12:50 11/18/11 12:26 Iron

Client Sample ID: OC-SD-SD2-0.0/0.5 Date Collected: 11/11/11 12:20

Date Received: 11/11/11 17:25

Result Qualifier MDL Unit D Dil Fac Analyte RL Prepared Analyzed Aluminum 11000 B 11 1.6 mg/Kg 11/16/11 12:50 11/18/11 12:29 Chromium 130 0.72 0.36 ma/Ka 11/16/11 12:50 11/18/11 12:29 25 11/16/11 12:50 11/18/11 12:29 14000 B mg/Kg Iron

Client Sample ID: OC-SD-SD3-0.0/0.5 Date Collected: 11/11/11 12:10

Date Received: 11/11/11 17:25

Result Qualifier RL MDL Unit Dil Fac D Prepared Analyzed Analyte 11/16/11 12:50 9700 B 13 1.8 mg/Kg 11/18/11 12:11 Aluminum 0.84 0.42 mg/Kg 11/16/11 12:50 11/18/11 12:11 Chromium 35 14000 B 29 1.6 mg/Kg 11/16/11 12:50 11/18/11 12:11 Iron

Client Sample ID: OC-SD-SD3 DUP-0.0/0.5

Date Collected: 11/11/11 12:10

Date Received: 11/11/11 17:25

Result Qualifier RL MDL Unit Analyte Prepared Analyzed Dil Fac # 9800 11 1.6 mg/Kg 11/21/11 10:33 11/21/11 18:10 Aluminum 0.73 11/21/11 18:10 0.37 mg/Kg 11/21/11 10:33 Chromium 45 14000 B 26 1.4 mg/Kg 11/21/11 10:33 11/21/11 18:10 Iron

Client Sample ID: OC-SD-SD4-0.0/0.5

Date Collected: 11/11/11 12:00

Date Received: 11/11/11 17:25

Percent Solids: 65.7 MDL Unit D Analyte Result Qualifier RL Prepared Analyzed Dil Fac 9900 B 14 2.1 mg/Kg 11/16/11 12:50 11/18/11 12:32 Aluminum 0.95 mg/Kg 11/16/11 12:50 11/18/11 12:32 Chromium 140 0.48

33

1.8 mg/Kg

Client Sample ID: OC-SD-SD5-0.0/0.5

Date Collected: 11/11/11 11:50

Iron

Date Received: 11/11/11 17:25

Lab Sample ID: 360-37595-6	
Matrix: Solid	
Percent Solids: 73.3	

11/16/11 12:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	11000	3	11	1.7	mg/Kg	草	11/21/11 10:33	11/21/11 18:13	1
Chromium	59		0.76	0.38	mg/Kg	章	11/21/11 10:33	11/21/11 18:13	1
Iron	15000	,B	27	1.4	mg/Kg	草	11/21/11 10:33	11/21/11 18:13	1

17000 B

TestAmerica Westfield 11/30/2011

# QC Sample Results

Client: Olin Corporation Project/Site: Olin Chemical TestAmerica Job ID: 360-37595-1

Client Sample ID: Lab Control Sample Dup

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Method: 6010B - Metals (ICP) (Continued)

Lab Sample ID: LCDSRM 360-83671/3-A LCDSRM Matrix: Solid

Analysis Batch: 83721 Spike LCDSRM LCDSRM

Prep Type: Total/NA Prep Batch: 83671 RPD Analyte Added Result Qualifier Unit %Rec Limits RPD Limit 221 89.9 - 279 Aluminum 7740 17100 mg/Kg 12 30 Chromium 272 255 68.0 - 124 mg/Kg 5 30 Iron 13100 23000 mg/Kg 68.6 - 239 5

Lab Sample ID: LCSSRM 360-83671/2-A Matrix: Solid

Analysis Batch: 83721

Prep Batch: 83671 Spike LCSSRM LCSSRM Analyte Added Result Qualifier Unit %Rec Limits 7740 15200 197 Aluminum mg/Kg 89.9 - 279 Chromium 272 267 mg/Kg 98 68.0 - 124 Iron 13100 21900 mg/Kg 68.6 - 239

#### 6.0 **Matrix Spikes**

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs collected? List project samples that were

ACTION: If no, contact senior chemist to see if any were specified.

6.2 Is the Matrix Spike/Matrix Spike Duplicate Recovery Form present?

NOTE: A full target, second source MS/MSD is required by MADEP.

ACTION: If any matrix spike data are missing, call lab for resubmission.

6.3 Were matrix spikes analyzed as indicated on the COC and project schedule?

ACTION: If any matrix spike data are missing, call lab for resubmission. If none, no qualification is needed. Narrate non-compliance.

6.4 Are any metal spike recoveries outside of the QC limits?

Sample Type	MADEP % Rec	QAPP % Rec	Method
Water	75-125	N/A	6010B
Water	N/A	70-130	200.7
Soil	75-125	75-125	6010B

**NOTE**:  $%R = (SSR-SR) \times 100\%$ SA

NOTE: If dilutions are required due to high sample concentrations (> 4X spike), the data are evaluated, but no flags are applied.

Yes [ No [ ] N/A [ ] Comments:

Yes No No NA Comments:

MS and or MSD precuit reconeries of aliminum (224) and 70-130 200.7
75-125 6010B iron (494 and - 124) were orticle of all limits.

Where: SSR = Spiked sample result In spiked sample ones to time of aluminum and SR = Sample result

SA = Spike added iron were greater than Hx spike concentrations.

No qualifation was required.

NOTE: If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags. ACTION: MS/MSD flags only apply to the sample spiked. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit, qualify positive results and non-detects (J). Are any RPDs for MS/MSD recoveries outside of the QC limits? NOTE:  $RPD = S-D \times 100\%$ Where: S = MS sample result (S+D)/2D = MSD sample result NOTE: If dilutions are required due to high sample concentrations, the data are evaluated, but no flags are applied. ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects (J).7.0 **Laboratory Duplicate** 7.1 Was a laboratory duplicate sample analyzed? If so, is the Laboratory Yes [\_] Duplicate Sample Form present? NOTE: MADEP refers to this sample as a "matrix duplicate". ACTION: If not analyzed, qualification is not needed. If data is missing, contact laboratory for resubmission of report. Narrate non-compliance. 7.2 Is the RPD between the result for the laboratory duplicate sample and the result for the parent sample outside of the QA/QC limits?

MADEP Laboratory Duplicate Sample RPD Criteria:	QAPP RPD
For aqueous results > $5 \times RL$ , RPD must be $\pm 20\%$	20
For aqueous results < 5x RL, RPD must be ≤ RL	20
For soil/sediment results > $5 \times$ RL, RPD must be $\pm 35\%$	20
For soil/sediment results $< 5 \times RL$ , RPD must be $\leq 2 \times RL$	20

**ACTION**: If the RPD exceeds the limits, qualify both positive results and non-detects as estimated and flag them J. Narrate non-compliance

# 8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

	8.1 the asso	Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of ociated samples from the senior chemist.	Yes [_]	No [	N/A []	Comments:
	8.2	Do any rinsate blanks have positive results?	Yes[]	No.f I	N/A [ /	<u></u>
NOTE	: MAL	DEP does not require the collection of rinsate blanks.	I ES []	140 []	N/A	Comments:

ACTION: Evaluate rinsate results against blank results to determine if contaminant

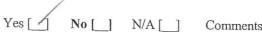
may be laboratory-derived. If results are not lab-related, qualify according to below. If the sample concentration is  $< 5 \times$  blank value, flag sample result non-detect "U" at the

If the sample concentration is  $> 5 \times$  blank value, no qualification is needed.

PQL or the concentration reported if greater than the PQL.

# 9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated Yes



6C-SD300/0.5

9.2 Were field duplicates collected per the required frequency?	Yes	Comments:	
SOW ☐ QAPP (1 per 10) ☐ MADEP Option 1 (1 per 20) ☐ MADEP Option 3 (1 per 10) L			
9.3 Was the RPD $\leq$ 50% for soils or waters? Calculate the RPD for all results an attach to this review.	H Yes No No N/A	Comments:	See a Harly
ACTION: RPD must be ≤50% for soil and water. Qualify data (J) for both sample result	s if the RPD exceeds 50%.		
10.0 Special QA/QC			
10.1 Were both total and dissolved metals analysis performed? If so, th dissolved metal concentration should not exceed that of the total metal.	e Yes Not N/A	Comments:	
<b>ACTION:</b> If results for both total and dissolved are $\geq 5x$ the PQL and the dissolve concentration is 10% higher than the total, flag both results as estimated (J). If total and dissolved concentrations are less than $5x$ the PQL and the difference exceeds $2x$ the PQL and $2x$	d		

PQL, flag both results as estimated (J)

# VALIDATION REPORT 360-37595-1 METALS SEDIMENTS FIELD DUPLICATE RPD ASSESSMENT NOVEMBER 2011 OLIN SLURRY WALL CAP

Sample ID	Analyte	Orig	Q	DUP	Q	RPD
OC-SD-SD3-0.0/0.5	Aluminum	9700	J	9800 .	J	1.0
OC-SD-SD3-0.0/0.5	Chromium	35		45		25
OC-SD-SD3-0.0/0.5	Iron	14000	J	14000 .	J	0

10.0	Application of Validation	Qualifiers
------	---------------------------	------------

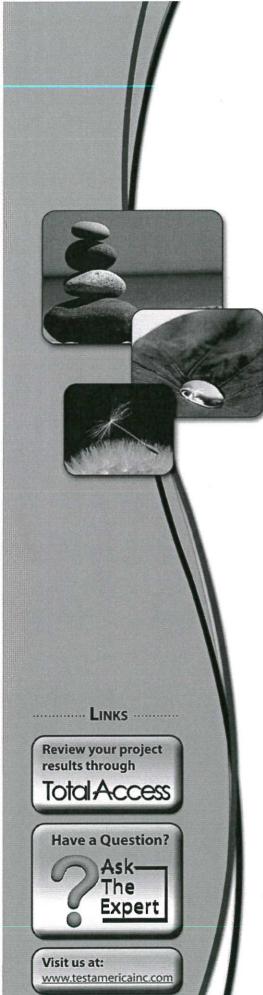
Was any of the data qualified?

Yes [	No [_]	N/A []	Comments

If so, apply data qualifiers directly to the DQE copy of laboratory report and flag pages for entry in database.

### REFERENCES

- LAW, 1999, "Final Quality Assurance Project Plan, Olin Wilmington Property, 51 Eames Street, Wilmington, MA", LAW Engineering and Environmental Services, Kennesaw, GA 30144. August 1999
- U.S. Environmental Protection Agency (USEPA), 1989. "Region 1 Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses"; Hazardous Site Evaluation Division; February 1989.
- MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Compendium of Quality Control Requirements and Performance Standards for Selected Analytical Protocols," WSC-CAM #10-320, Final, Revision No. 1, 1 July 2010.
- MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data in Support of Action Conducted Under the Massachusetts Contingency Plan (MCP)," WSC-CAM, Section VIIA, Final, Revision No. 1, 1 July 2010.
- MADEP, 2010. "Quality Control Requirements and Performance Standards for the Analysis of Trace Metals by Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES) in Support of Response Actions under the Massachusetts Contingency Plan (MCP)" WSC-CAM, Final, Revision No. 1, 5 July 2010.



# FILE COPY

# **TestAmerica**

THE LEADER IN ENVIRONMENTAL TESTING

# ANALYTICAL REPORT

TestAmerica Laboratories. Inc. TestAmerica Westfield Westfield Executive Park 53 Southampton Road Westfield, MA 01085 Tel: (413)572-4000

OF PARAMETERS ORDERED BY: CHECKED FOR COMPLETENESS

TestAmerica Job ID: 360-37491-1

Client Project/Site: Olin Chemical Surfacewater

For:

Olin Corporation **PO BOX 248** 

CHECKED FOR COMPLETENESS Charleston, Tennessee 37310-0248

Attn: Mr. James Cashwell

PReynold

Authorized for release by: 11/28/2011 2:29:40 PM

Chris Revnolds **QA** Manager

chris.reynolds@testamericainc.com

Designee for

Becky Mason

Project Manager II

becky.mason@testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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#### **Case Narrative**

Client: Olin Corporation

Project/Site: Olin Chemical Surfacewater

TestAmerica Job ID: 360-37491-1

Job ID: 360-37491-1

**Laboratory: TestAmerica Westfield** 

#### Narrative

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

TestAmerica's Reporting Limits (RLs) for this report may not always meet WSC-CAM-III method reporting limits due to various reasons such as methodology, dilutions or moisture content (soils). TestAmerica's MA pivot table EDD documents which compound(s) exceed certain regulatory standards. If not included with your deliverables, please contact your Project Manager about the availability of this EDD for your report.

#### RECEIPT

The samples were received on 11/08/2011; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was C.

Note: All samples that require thermal preservation are considered acceptable if the arrival temperature is within the method's specified temperature range or for general analysis, ranging from 6°C to just above the freezing temperature of water. Samples that are hand delivered, immediately following collection, may not meet these criteria; however, they will be considered acceptable according to NELAC and State standards, if there is evidence that the chilling process has begun, such as stored and transported to the laboratory on ice.

#### **DISSOLVED METALS**

Samples OC-SW-ISC01 (360-37491-1), OC-SW-ISC02 (360-37491-2), OC-SW-ISC03 (360-37491-3), OC-SW-PZ16RR (360-37491-4), OC-SW-PZ17RR (360-37491-5), OC-SW-PZ18R (360-37491-6), OC-SW-SD17 (360-37491-7) and OC-SW-PZ18R-DUP (360-37491-8) were analyzed for dissolved metals in accordance with EPA SW-846 Method 6010B. The samples were analyzed on 11/15/2011.

At the request of the client, an abbreviated/modified MCP analyte list was reported for this job.

No difficulties were encountered during the dissolved metals analyses.

All quality control parameters were within the acceptance limits.

#### **TOTAL METALS (ICP)**

Samples OC-SW-ISC01 (360-37491-1), OC-SW-ISC02 (360-37491-2), OC-SW-ISC03 (360-37491-3), OC-SW-PZ16RR (360-37491-4), OC-SW-PZ17RR (360-37491-5), OC-SW-PZ18R (360-37491-6), OC-SW-SD17 (360-37491-7) and OC-SW-PZ18R-DUP (360-37491-8) were analyzed for total metals (ICP) in accordance with EPA SW-846 Method 6010B. The samples were prepared on 11/09/2011 and 11/10/2011 and analyzed on 11/11/2011.

Sodium was detected in method blank MB 360-83163/1-A at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged "J". If the associated sample reported a result above the MDL and/or RL, the result has been "B" flagged. Refer to the QC report for details.

At the request of the client, an abbreviated/modified MCP analyte list was reported for this job.

No other difficulties were encountered during the metals analyses.

All other quality control parameters were within the acceptance limits.

#### **SPECIFIC CONDUCTIVITY**

Samples OC-SW-ISC01 (360-37491-1), OC-SW-ISC02 (360-37491-2), OC-SW-ISC03 (360-37491-3), OC-SW-PZ16RR (360-37491-4),

TestAmerica Westfield 11/28/2011

3

6

9

11

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14

#### **Case Narrative**

Client: Olin Corporation

Project/Site: Olin Chemical Surfacewater

TestAmerica Job ID: 360-37491-1

## Job ID: 360-37491-1 (Continued)

#### Laboratory: TestAmerica Westfield (Continued)

OC-SW-PZ17RR (360-37491-5), OC-SW-PZ18R (360-37491-6), OC-SW-SD17 (360-37491-7) and OC-SW-PZ18R-DUP (360-37491-8) were analyzed for specific conductivity in accordance with SM20 2510B. The samples were analyzed on 11/12/2011.

No difficulties were encountered during the conductivity analyses.

All quality control parameters were within the acceptance limits.

#### **ANIONS (28 DAY HOLD TIME)**

Samples OC-SW-ISC01 (360-37491-1), OC-SW-ISC02 (360-37491-2), OC-SW-ISC03 (360-37491-3), OC-SW-PZ16RR (360-37491-4), OC-SW-PZ17RR (360-37491-5), OC-SW-PZ18R (360-37491-6), OC-SW-SD17 (360-37491-7) and OC-SW-PZ18R-DUP (360-37491-8) were analyzed for anions (28 day hold time) in accordance with EPA Method 300.0. The samples were analyzed on 11/09/2011 and 11/10/2011.

Samples OC-SW-ISC01 (360-37491-1)[10X], OC-SW-ISC02 (360-37491-2)[10X], OC-SW-ISC03 (360-37491-3)[10X], OC-SW-PZ16RR (360-37491-4)[10X], OC-SW-PZ17RR (360-37491-5)[10X], OC-SW-PZ18R (360-37491-6)[10X], OC-SW-SD17 (360-37491-7)[10X] and OC-SW-PZ18R-DUP (360-37491-8)[10X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No difficulties were encountered during the anions analyses.

All quality control parameters were within the acceptance limits.

#### **ANIONS (48 HR HOLD TIME)**

Samples OC-SW-ISC01 (360-37491-1), OC-SW-ISC02 (360-37491-2), OC-SW-ISC03 (360-37491-3), OC-SW-PZ16RR (360-37491-4), OC-SW-PZ17RR (360-37491-5), OC-SW-PZ18R (360-37491-6), OC-SW-SD17 (360-37491-7) and OC-SW-PZ18R-DUP (360-37491-8) were analyzed for anions (48 hr hold time) in accordance with EPA Method 300.0. The samples were analyzed on 11/09/2011 and 11/10/2011.

Samples OC-SW-ISC03 (360-37491-3)[10X], OC-SW-PZ16RR (360-37491-4)[10X] and OC-SW-PZ17RR (360-37491-5)[10X] required dilution prior to analysis due to the presence of elevated chloride concentration which co-elutes with the nitrite peak. The reporting limits have been adjusted accordingly.

No difficulties were encountered during the anions analyses.

All quality control parameters were within the acceptance limits.

#### **AMMONIA**

Samples OC-SW-ISC01 (360-37491-1), OC-SW-ISC02 (360-37491-2), OC-SW-ISC03 (360-37491-3), OC-SW-PZ16RR (360-37491-4), OC-SW-PZ17RR (360-37491-5), OC-SW-PZ18R (360-37491-6), OC-SW-SD17 (360-37491-7) and OC-SW-PZ18R-DUP (360-37491-8) were analyzed for ammonia in accordance with Lachat 107-06-1B. The samples were prepared on 11/15/2011 and analyzed on 11/16/2011.

Ammonia failed the recovery criteria high for the MS of sample OC-SW-PZ18RMS (360-37491-6) in batch 360-83489.

Ammonia failed the recovery criteria high for the MSD of sample OC-SW-PZ18RMSD (360-37491-6) in batch 360-83489. The presence of the '4' qualifier in the report indicates analytes where the concentration in the unspiked sample exceeded four times the spiking amount.

Refer to the QC report for details.

Samples OC-SW-ISC01 (360-37491-1)[10X], OC-SW-ISC02 (360-37491-2)[10X], OC-SW-PZ16RR (360-37491-4)[10X], OC-SW-PZ17RR (360-37491-5)[10X], OC-SW-PZ18R (360-37491-6)[10X], OC-SW-SD17 (360-37491-7)[10X] and OC-SW-PZ18R-DUP (360-37491-8)[10X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No other difficulties were encountered during the ammonia analyses.

All other quality control parameters were within the acceptance limits.

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TestAmerica Job ID: 360-37491-1

Client: Olin Corporation

Project/Site: Olin Chemical Surfacewater

Client Sample ID: OC-SW-ISC01

Lab Sample ID: 360-37491-	1
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Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	150	-	100	13	ug/L	1	_	6010B	Dissolved
Chromium	13		5.0	0.65	ug/L	1		6010B	Dissolved
Sodium	98000		2000	280	ug/L	1		6010B	Dissolved
Aluminum	330		100	13	ug/L	1		6010B	Total/NA
Chromium	30		5.0	0.65	ug/L	1		6010B	Total/NA
Sodium	89000		2000	280	ug/L	1		6010B	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Nitrate as N	0.20		0.050	0.050	mg/L	1	_	300.0	Total/NA
Sulfate	110		20	20	mg/L	10		300.0	Total/NA
Chloride	120		10	10	mg/L	10		300.0	Total/NA
Ammonia	25		1.0	1.0	mg/L	10		L107-06-1B	Total/NA
Specific Conductance	760		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

# Client Sample ID: OC-SW-ISC02

# Lab Sample ID: 360-37491-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	130		100	13	ug/L	1	_	6010B	Dissolved
Chromium	27		5.0	0.65	ug/L	1		6010B	Dissolved
Sodium	100000		2000	280	ug/L	1		6010B	Dissolved
Aluminum	4000		100	13	ug/L	1		6010B	Total/NA
Chromium	750		5.0	0.65	ug/L	1		6010B	Total/NA
Sodium	84000		2000	280	ug/L	1		6010B	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Nitrate as N	1.1		0.050	0.050	mg/L	1	_	300.0	Total/NA
Sulfate	180		20	20	mg/L	10		300.0	Total/NA
Chloride	97		10	10	mg/L	10		300.0	Total/NA
Ammonia	33		1.0	1.0	mg/L	10		L107-06-1B	Total/NA
Specific Conductance	860		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

## Client Sample ID: OC-SW-ISC03

## Lab Sample ID: 360-37491-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	28	J	100	13	ug/L	1	_	6010B	Dissolved
Sodium	100000		2000	280	ug/L	1		6010B	Dissolved
Aluminum	200		100	13	ug/L	1		6010B	Total/NA
Chromium	2.0	J	5.0	0.65	ug/L	1		6010B	Total/NA
Sodium	93000		2000	280	ug/L	1		6010B	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Nitrate as N	1.0		0.050	0.050	mg/L	1	_	300.0	Total/NA
Sulfate	33		2.0	2.0	mg/L	1		300.0	Total/NA
Chloride	170		10	10	mg/L	10		300.0	Total/NA
Ammonia	1.7		0.10	0.10	mg/L	1		L107-06-1B	Total/NA
Specific Conductance	740		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

# Client Sample ID: OC-SW-PZ16RR

# Lab Sample ID: 360-37491-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	69	J	100	13	ug/L	1	_	6010B	Dissolved
Chromium	23		5.0	0.65	ug/L	1		6010B	Dissolved
Sodium	130000		2000	280	ug/L	1		6010B	Dissolved
Aluminum	1800		100	13	ug/L	1		6010B	Total/NA
Chromium	380		5.0	0.65	ug/L	1		6010B	Total/NA
Sodium	110000		2000	280	ug/L	1		6010B	Total/NA

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TestAmerica Job ID: 360-37491-1

Client: Olin Corporation

Project/Site: Olin Chemical Surfacewater

Client Sample ID: OC-SW-PZ16RR (Continued)

Lab	Sample	ID:	360-37491-4
Lab	Jailible	ıD.	JUU-J1 TJ 1-T

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Nitrate as N	1.8		0.050	0.050	mg/L	1	_	300.0	Total/NA
Sulfate	160		20	20	mg/L	10		300.0	Total/NA
Chloride	120		10	10	mg/L	10		300.0	Total/NA
Ammonia	31		1.0	1.0	mg/L	10		L107-06-1B	Total/NA
Specific Conductance	950		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

# Client Sample ID: OC-SW-PZ17RR

# Lab Sample ID: 360-37491-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	110		100	13	ug/L	1	_	6010B	Dissolved
Chromium	55		5.0	0.65	ug/L	1		6010B	Dissolved
Sodium	140000		2000	280	ug/L	1		6010B	Dissolved
Aluminum	2000		100	13	ug/L	1		6010B	Total/NA
Chromium	470		5.0	0.65	ug/L	1		6010B	Total/NA
Sodium	120000		2000	280	ug/L	1		6010B	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Nitrate as N	1.8		0.050	0.050	mg/L	1	_	300.0	Total/NA
Sulfate	180		20	20	mg/L	10		300.0	Total/NA
Chloride	130		10	10	mg/L	10		300.0	Total/NA
Ammonia	33		1.0	1.0	mg/L	10		L107-06-1B	Total/NA
Specific Conductance	1000		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

# Client Sample ID: OC-SW-PZ18R

# Lab Sample ID: 360-37491-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	170		100	13	ug/L	1	_	6010B	Dissolved
Chromium	14		5.0	0.65	ug/L	1		6010B	Dissolved
Sodium	96000		2000	280	ug/L	1		6010B	Dissolved
Aluminum	270		100	13	ug/L	1		6010B	Total/NA
Chromium	22		5.0	0.65	ug/L	1		6010B	Total/NA
Sodium	88000		2000	280	ug/L	1		6010B	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Nitrate as N	0.20		0.050	0.050	mg/L	1	_	300.0	Total/NA
Sulfate	120		20	20	mg/L	10		300.0	Total/NA
Chloride	120		10	10	mg/L	10		300.0	Total/NA
Ammonia	30		1.0	1.0	mg/L	10		L107-06-1B	Total/NA
Specific Conductance	780		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

# Client Sample ID: OC-SW-SD17

# Lab Sample ID: 360-37491-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	1900		100	13	ug/L	1	_	6010B	Dissolved
Chromium	370		5.0	0.65	ug/L	1		6010B	Dissolved
Sodium	140000		2000	280	ug/L	1		6010B	Dissolved
Aluminum	2100		100	13	ug/L	1		6010B	Total/NA
Chromium	470		5.0	0.65	ug/L	1		6010B	Total/NA
Sodium	120000	В	2000	280	ug/L	1		6010B	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Nitrate as N	1.7		0.050	0.050	mg/L	1	_	300.0	Total/NA
Sulfate	190		20	20	mg/L	10		300.0	Total/NA
Chloride	130		10	10	mg/L	10		300.0	Total/NA
Ammonia	32		1.0	1.0	mg/L	10		L107-06-1B	Total/NA
Specific Conductance	1000		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

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# **Detection Summary**

Client: Olin Corporation

Project/Site: Olin Chemical Surfacewater

TestAmerica Job ID: 360-37491-1

Client Sample ID: OC-SW-PZ18R-DUP

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	180		100	13	ug/L	1	_	6010B	Dissolved
Chromium	15		5.0	0.65	ug/L	1		6010B	Dissolved
Sodium	96000		2000	280	ug/L	1		6010B	Dissolved
Aluminum	260		100	13	ug/L	1		6010B	Total/NA
Chromium	21		5.0	0.65	ug/L	1		6010B	Total/NA
Sodium	83000	В	2000	280	ug/L	1		6010B	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Nitrate as N	0.20		0.050	0.050	mg/L	1	_	300.0	Total/NA
Sulfate	110		20	20	mg/L	10		300.0	Total/NA
Chloride	120		10	10	mg/L	10		300.0	Total/NA
Ammonia	29		1.0	1.0	mg/L	10		L107-06-1B	Total/NA
Specific Conductance	780		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

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# **Method Summary**

Client: Olin Corporation

Project/Site: Olin Chemical Surfacewater

TestAmerica Job ID: 360-37491-1

Method	Method Description	Protocol	Laboratory
6010B	Total Metals	SW846	TAL WFD
6010B	Dissolved Metals	SW846	TAL WFD
300.0	Chloride & Sulfate	40CFR136A	TAL WFD
300.0	Nitrate & Nitrite	40CFR136A	TAL WFD
L107-06-1B	Nitrogen Ammonia	LACHAT	TAL WFD
SM 2510B	Conductivity, Specific Conductance	SM	TAL WFD

#### **Protocol References:**

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.

LACHAT = LACHAT

SM = "Standard Methods For The Examination Of Water And Wastewater",

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

#### **Laboratory References:**

TAL WFD = TestAmerica Westfield, Westfield Executive Park, 53 Southampton Road, Westfield, MA 01085, TEL (413)572-4000

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# **Sample Summary**

Client: Olin Corporation

Project/Site: Olin Chemical Surfacewater

TestAmerica Job ID: 360-37491-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
360-37491-1	OC-SW-ISC01	Water	11/08/11 12:45	11/08/11 17:10
360-37491-2	OC-SW-ISC02	Water	11/08/11 11:45	11/08/11 17:10
360-37491-3	OC-SW-ISC03	Water	11/08/11 11:30	11/08/11 17:10
360-37491-4	OC-SW-PZ16RR	Water	11/08/11 11:55	11/08/11 17:10
360-37491-5	OC-SW-PZ17RR	Water	11/08/11 12:10	11/08/11 17:10
360-37491-6	OC-SW-PZ18R	Water	11/08/11 12:30	11/08/11 17:10
360-37491-7	OC-SW-SD17	Water	11/08/11 12:20	11/08/11 17:10
360-37491-8	OC-SW-PZ18R-DUP	Water	11/08/11 12:30	11/08/11 17:10

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Client: Olin Corporation

Project/Site: Olin Chemical Surfacewater

TestAmerica Job ID: 360-37491-1

## Method: 6010B - Dissolved Metals - Dissolved

Lab Sample ID: 360-37491-1 Client Sample ID: OC-SW-ISC01

Date Collected: 11/08/11 12:45 **Matrix: Water** 

Date Received: 11/08/11 17:10

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	150		100	13	ug/L		-	11/15/11 17:05	1
Chromium	13		5.0	0.65	ug/L			11/15/11 17:05	1
Sodium	98000		2000	280	ug/L			11/15/11 17:05	1

Client Sample ID: OC-SW-ISC02 Lab Sample ID: 360-37491-2

Date Collected: 11/08/11 11:45 **Matrix: Water** 

Date Received: 11/08/11 17:10

Analyte	Result	Qualifier	RL	MDL	Unit	D	)	Prepared	Analyzed	Dil Fac
Aluminum	130		100	13	ug/L				11/15/11 17:08	1
Chromium	27		5.0	0.65	ug/L				11/15/11 17:08	1
Sodium	100000		2000	280	ug/L				11/15/11 17:08	1

Client Sample ID: OC-SW-ISC03 Lab Sample ID: 360-37491-3

Date Collected: 11/08/11 11:30 **Matrix: Water** 

Date Received: 11/08/11 17:10

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	28	J	100	13	ug/L			11/15/11 17:11	1
Chromium	ND		5.0	0.65	ug/L			11/15/11 17:11	1
Sodium	100000		2000	280	ug/L			11/15/11 17:11	1

Client Sample ID: OC-SW-PZ16RR Lab Sample ID: 360-37491-4

Date Collected: 11/08/11 11:55

Date Received: 11/08/11 17:10

Analyte	Result Qualifier	r RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	69 J	100	13	ug/L			11/15/11 17:18	1
Chromium	23	5.0	0.65	ug/L			11/15/11 17:18	1
Sodium	130000	2000	280	ug/L			11/15/11 17:18	1

Client Sample ID: OC-SW-PZ17RR Lab Sample ID: 360-37491-5

Date Collected: 11/08/11 12:10

Date Received: 11/08/11 17:10

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	110		100	13	ug/L	_		11/15/11 17:21	1
Chromium	55		5.0	0.65	ug/L			11/15/11 17:21	1
Sodium	140000		2000	280	ug/L			11/15/11 17:21	1

Client Sample ID: OC-SW-PZ18R Lab Sample ID: 360-37491-6

Date Collected: 11/08/11 12:30

Date Received: 11/08/11 17:10

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	170		100	13	ug/L			11/15/11 16:47	1
Chromium	14		5.0	0.65	ug/L			11/15/11 16:47	1
Sodium	96000		2000	280	ug/L			11/15/11 16:47	1

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**Matrix: Water** 

**Matrix: Water** 

**Matrix: Water** 

# **Client Sample Results**

Client: Olin Corporation

Project/Site: Olin Chemical Surfacewater

TestAmerica Job ID: 360-37491-1

Lab Sample ID: 360-37491-7

**Matrix: Water** 

Method: 6010B - Dissolved Metals - Dissolved

Client Sample ID: OC-SW-SD17

Date Collected: 11/08/11 12:20 Date Received: 11/08/11 17:10

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1900		100	13	ug/L			11/15/11 17:24	1
Chromium	370		5.0	0.65	ug/L			11/15/11 17:24	1
Sodium	140000		2000	280	ug/L			11/15/11 17:24	1

Client Sample ID: OC-SW-PZ18R-DUP

Date Collected: 11/08/11 12:30

Lab Sample ID: 360-37491-8

Matrix: Water

Date Received: 11/08/11 17:10

Analyte	Result C	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	180		100	13	ug/L			11/15/11 17:26	1
Chromium	15		5.0	0.65	ug/L			11/15/11 17:26	1
Sodium	96000		2000	280	ug/L			11/15/11 17:26	1

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Client: Olin Corporation

Project/Site: Olin Chemical Surfacewater

TestAmerica Job ID: 360-37491-1

Method: 6010B - Total Metals

Lab Sample ID: 360-37491-1 Client Sample ID: OC-SW-ISC01 Date Collected: 11/08/11 12:45

**Matrix: Water** 

Date Received: 11/08/11 17:10

Analyte	Result Qualifier	RL	MDL U	nit	D	Prepared	Analyzed	Dil Fac
Aluminum	330	100	13 uç	g/L	_	11/09/11 11:49	11/11/11 18:17	1
Chromium	30	5.0	0.65 uç	g/L		11/09/11 11:49	11/11/11 18:17	1
Sodium	89000	2000	280 ug	g/L		11/09/11 11:49	11/11/11 18:17	1

Client Sample ID: OC-SW-ISC02 Lab Sample ID: 360-37491-2

Date Collected: 11/08/11 11:45 **Matrix: Water** 

Date Received: 11/08/11 17:10

Analyte	Result Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	4000	100	13	ug/L		11/09/11 11:49	11/11/11 18:20	1
Chromium	750	5.0	0.65	ug/L		11/09/11 11:49	11/11/11 18:20	1
Sodium	84000	2000	280	ug/L		11/09/11 11:49	11/11/11 18:20	1

Client Sample ID: OC-SW-ISC03 Lab Sample ID: 360-37491-3

Date Collected: 11/08/11 11:30 **Matrix: Water** 

Date Received: 11/08/11 17:10

Analyte	Result	Qualifier	RL	MDL	Unit	Prepared	Analyzed	Dil Fac
Aluminum	200		100	13	ug/L	11/09/11 11:49	11/11/11 18:23	1
Chromium	2.0	J	5.0	0.65	ug/L	11/09/11 11:49	11/11/11 18:23	1
Sodium	93000		2000	280	ug/L	11/09/11 11:49	11/11/11 18:23	1

Client Sample ID: OC-SW-PZ16RR Lab Sample ID: 360-37491-4 Date Collected: 11/08/11 11:55 **Matrix: Water** 

Date Received: 11/08/11 17:10

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1800		100	13	ug/L		11/09/11 11:49	11/11/11 18:26	1
Chromium	380		5.0	0.65	ug/L		11/09/11 11:49	11/11/11 18:26	1
Sodium	110000		2000	280	ug/L		11/09/11 11:49	11/11/11 18:26	1

Client Sample ID: OC-SW-PZ17RR Lab Sample ID: 360-37491-5

Date Collected: 11/08/11 12:10 Date Received: 11/08/11 17:10

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	2000		100	13	ug/L		11/09/11 11:49	11/11/11 18:29	1
Chromium	470		5.0	0.65	ug/L		11/09/11 11:49	11/11/11 18:29	1
Sodium	120000		2000	280	ug/L		11/09/11 11:49	11/11/11 18:29	1

Client Sample ID: OC-SW-PZ18R Lab Sample ID: 360-37491-6

Date Collected: 11/08/11 12:30 **Matrix: Water** 

Date Received: 11/08/11 17:10

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	270		100	13	ug/L		11/09/11 11:49	11/11/11 17:57	1
Chromium	22		5.0	0.65	ug/L		11/09/11 11:49	11/11/11 17:57	1
Sodium	88000		2000	280	ug/L		11/09/11 11:49	11/11/11 17:57	1

**Matrix: Water** 

# **Client Sample Results**

Client: Olin Corporation

Project/Site: Olin Chemical Surfacewater

TestAmerica Job ID: 360-37491-1

Method: 6010B - Total Metals

Client Sample ID: OC-SW-SD17

Lab Sample ID: 360-37491-7 Date Collected: 11/08/11 12:20 **Matrix: Water** 

Date Received: 11/08/11 17:10

Analyte	Result Quali	ifier RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	2100	100	13	ug/L		11/10/11 08:48	11/14/11 15:00	1
Chromium	470	5.0	0.65	ug/L		11/10/11 08:48	11/14/11 15:00	1
Sodium	120000 B	2000	280	ug/L		11/10/11 08:48	11/14/11 15:00	1

Client Sample ID: OC-SW-PZ18R-DUP Lab Sample ID: 360-37491-8 Date Collected: 11/08/11 12:30 **Matrix: Water** 

Date Received: 11/08/11 17:10

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	260		100	13	ug/L		11/10/11 08:48	11/14/11 14:52	1
Chromium	21		5.0	0.65	ug/L		11/10/11 08:48	11/14/11 14:52	1
Sodium	83000	В	2000	280	ug/L		11/10/11 08:48	11/14/11 14:52	1

Client: Olin Corporation

Project/Site: Olin Chemical Surfacewater

**General Chemistry** 

Client Sample ID: OC-SW-ISC01 Date Collected: 11/08/11 12:45

Date Received: 11/08/11 17:10

**Matrix: Water** 

**Matrix: Water** 

Analyte Result Qualifier RL RL Unit D Prepared Analyzed Dil Fac 0.050 0.050 mg/L 11/10/11 00:24 Nitrate as N 0.20 **Sulfate** 110 20 20 mg/L 11/10/11 00:37 10 10 mg/L 11/10/11 00:37 10 Chloride 120 10 Nitrite as N ND 0.010 0.010 mg/L 11/10/11 00:24 11/15/11 14:32 **Ammonia** 25 10 1.0 mg/L 11/16/11 15:18 10 760 1.0 1.0 umhos/cm 11/12/11 09:52 **Specific Conductance** 

Client Sample ID: OC-SW-ISC02 Lab Sample ID: 360-37491-2

Date Collected: 11/08/11 11:45 Date Received: 11/08/11 17:10

Result Qualifier RL Unit Analyte RL D Prepared Analyzed Dil Fac Nitrate as N 1.1 0.050 0.050 mg/L 11/09/11 20:36 11/09/11 20:52 Sulfate 20 20 mg/L 10 180 Chloride 97 10 mg/L 11/09/11 20:52 10 ND 0.010 Nitrite as N 0.010 mg/L 11/09/11 20:36 **Ammonia** 33 1.0 1.0 mg/L 11/15/11 14:32 11/16/11 15:19 10 **Specific Conductance** 860 1.0 1.0 umhos/cm 11/12/11 09:53

Client Sample ID: OC-SW-ISC03 Lab Sample ID: 360-37491-3 Date Collected: 11/08/11 11:30 **Matrix: Water** 

Date Received: 11/08/11 17:10

Analyte Result Qualifier RL **RL** Unit Prepared Analyzed Dil Fac 0.050 0.050 mg/L 11/09/11 20:03 Nitrate as N 1.0 **Sulfate** 33 2.0 2.0 mg/L 11/09/11 20:02 10 11/09/11 20:20 10 Chloride 170 10 mg/L Nitrite as N ND 0.10 0.10 mg/L 11/09/11 20:20 10 1.7 0.10 0.10 mg/L 11/15/11 14:32 11/16/11 14:57 **Ammonia** 11/12/11 09:54 **Specific Conductance** 740 1.0 1.0 umhos/cm

Client Sample ID: OC-SW-PZ16RR Lab Sample ID: 360-37491-4 **Matrix: Water** 

Date Collected: 11/08/11 11:55

Date Received: 11/08/11 17:10

Analyte	Result Qualific	ier RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	1.8	0.050	0.050	mg/L			11/09/11 21:08	1
Sulfate	160	20	20	mg/L			11/09/11 21:24	10
Chloride	120	10	10	mg/L			11/09/11 21:24	10
Nitrite as N	ND	0.10	0.10	mg/L			11/09/11 21:24	10
Ammonia	31	1.0	1.0	mg/L		11/15/11 14:32	11/16/11 15:20	10
Specific Conductance	950	1.0	1.0	umhos/cm			11/12/11 09:56	1

Lab Sample ID: 360-37491-5 Client Sample ID: OC-SW-PZ17RR Date Collected: 11/08/11 12:10 **Matrix: Water** 

Date Received: 11/08/11 17:10

Analyte	Result Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	1.8	0.050	0.050	mg/L			11/09/11 22:44	1

Client: Olin Corporation

Project/Site: Olin Chemical Surfacewater

# **General Chemistry (Continued)**

Client Sample ID: OC-SW-PZ17RR

Date Collected: 11/08/11 12:10 Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-5

. Matrix: Water

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	180		20	20	mg/L			11/09/11 23:01	10
Chloride	130		10	10	mg/L			11/09/11 23:01	10
Nitrite as N	ND		0.10	0.10	mg/L			11/09/11 23:01	10
Ammonia	33		1.0	1.0	mg/L		11/15/11 14:32	11/16/11 15:21	10
Specific Conductance	1000		1.0	1.0	umhos/cm			11/12/11 09:57	1

Lab Sample ID: 360-37491-6

Matrix: Water

Date Collected: 11/08/11 12:30 Date Received: 11/08/11 17:10

Client Sample ID: OC-SW-PZ18R

Analyte Result Qualifier RL RL Unit Prepared Analyzed Dil Fac 0.20 0.050 0.050 mg/L 11/09/11 23:17 Nitrate as N **Sulfate** 120 20 20 mg/L 11/09/11 23:33 10 10 10 mg/L 10 Chloride 120 11/09/11 23:33 Nitrite as N ND 0.010 0.010 mg/L 11/09/11 23:17 11/15/11 14:32 **Ammonia** 30 1.0 1.0 mg/L 11/16/11 15:15 **Specific Conductance** 780 1.0 1.0 umhos/cm 11/12/11 10:03

Lab Sample ID: 360-37491-7
Matrix: Water

Date Collected: 11/08/11 12:20

Date Received: 11/08/11 17:10

Client Sample ID: OC-SW-SD17

Analyte	Result C	Qualifier RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	1.7	0.050	0.050	mg/L			11/10/11 00:53	1
Sulfate	190	20	20	mg/L			11/10/11 01:09	10
Chloride	130	10	10	mg/L			11/10/11 01:09	10
Nitrite as N	ND	0.010	0.010	mg/L			11/10/11 00:53	1
Ammonia	32	1.0	1.0	mg/L		11/15/11 14:32	11/16/11 15:22	10
Specific Conductance	1000	1.0	1.0	umhos/cm			11/12/11 10:06	1

Client Sample ID: OC-SW-PZ18R-DUP

Date Collected: 11/08/11 12:30

Lab Sample ID: 360-37491-8

Matrix: Water

Date Received: 11/08/11 17:10

Analyte	Result (	Qualifier RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.20	0.050	0.050	mg/L			11/10/11 02:30	1
Sulfate	110	20	20	mg/L			11/10/11 02:46	10
Chloride	120	10	10	mg/L			11/10/11 02:46	10
Nitrite as N	ND	0.010	0.010	mg/L			11/10/11 02:30	1
Ammonia	29	1.0	1.0	mg/L		11/15/11 14:32	11/16/11 15:25	10
Specific Conductance	780	1.0	1.0	umhos/cm			11/12/11 10:08	1

TestAmerica Westfield 11/28/2011

# **Definitions/Glossary**

Client: Olin Corporation

Project/Site: Olin Chemical Surfacewater

TestAmerica Job ID: 360-37491-1

## **Qualifiers**

## Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
4	MS, MSD: The analyte present in the original sample is 4 times greater than the matrix spike concentration; therefore, control limits are not
	applicable.
В	Compound was found in the blank and sample.

# **General Chemistry**

Qualifier	Qualifier Description
F	MS or MSD exceeds the control limits

Glossary	
Abbreviation	These commonly used abbreviations may or may not be present in this report.
<del>\( \tilde{\ti}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}</del>	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CNF	Contains no Free Liquid
DL, RA, RE, IN	Indicates a Dilution, Reanalysis, Re-extraction, or additional Initial metals/anion analysis of the sample
EDL	Estimated Detection Limit
EPA	United States Environmental Protection Agency
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
RL	Reporting Limit
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

# **QC Association Summary**

Client: Olin Corporation

Project/Site: Olin Chemical Surfacewater

TestAmerica Job ID: 360-37491-1

## **Metals**

## Prep Batch: 83100

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37491-1	OC-SW-ISC01	Total/NA	Water	3010A	
360-37491-2	OC-SW-ISC02	Total/NA	Water	3010A	
360-37491-3	OC-SW-ISC03	Total/NA	Water	3010A	
360-37491-4	OC-SW-PZ16RR	Total/NA	Water	3010A	
360-37491-5	OC-SW-PZ17RR	Total/NA	Water	3010A	
360-37491-6	OC-SW-PZ18R	Total/NA	Water	3010A	
360-37491-6MS	OC-SW-PZ18R	Total/NA	Water	3010A	
360-37491-6MSD	OC-SW-PZ18R	Total/NA	Water	3010A	
LCS 360-83100/2-A	Lab Control Sample	Total/NA	Water	3010A	
LCSD 360-83100/3-A	Lab Control Sample Dup	Total/NA	Water	3010A	
MB 360-83100/1-A	Method Blank	Total/NA	Water	3010A	

## Prep Batch: 83163

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37491-7	OC-SW-SD17	Total/NA	Water	3010A	
360-37491-8	OC-SW-PZ18R-DUP	Total/NA	Water	3010A	
LCS 360-83163/2-A	Lab Control Sample	Total/NA	Water	3010A	
LCSD 360-83163/3-A	Lab Control Sample Dup	Total/NA	Water	3010A	
MB 360-83163/1-A	Method Blank	Total/NA	Water	3010A	

# **Analysis Batch: 83303**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37491-1	OC-SW-ISC01	Total/NA	Water	6010B	83100
360-37491-2	OC-SW-ISC02	Total/NA	Water	6010B	83100
360-37491-3	OC-SW-ISC03	Total/NA	Water	6010B	83100
360-37491-4	OC-SW-PZ16RR	Total/NA	Water	6010B	83100
360-37491-5	OC-SW-PZ17RR	Total/NA	Water	6010B	83100
360-37491-6	OC-SW-PZ18R	Total/NA	Water	6010B	83100
360-37491-6MS	OC-SW-PZ18R	Total/NA	Water	6010B	83100
360-37491-6MSD	OC-SW-PZ18R	Total/NA	Water	6010B	83100
LCS 360-83100/2-A	Lab Control Sample	Total/NA	Water	6010B	83100
LCSD 360-83100/3-A	Lab Control Sample Dup	Total/NA	Water	6010B	83100
MB 360-83100/1-A	Method Blank	Total/NA	Water	6010B	83100

## Analysis Batch: 83365

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37491-7	OC-SW-SD17	Total/NA	Water	6010B	83163
360-37491-8	OC-SW-PZ18R-DUP	Total/NA	Water	6010B	83163
LCS 360-83163/2-A	Lab Control Sample	Total/NA	Water	6010B	83163
LCSD 360-83163/3-A	Lab Control Sample Dup	Total/NA	Water	6010B	83163
MB 360-83163/1-A	Method Blank	Total/NA	Water	6010B	83163

# Analysis Batch: 83420

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37491-1	OC-SW-ISC01	Dissolved	Water	6010B	
360-37491-2	OC-SW-ISC02	Dissolved	Water	6010B	
360-37491-3	OC-SW-ISC03	Dissolved	Water	6010B	
360-37491-4	OC-SW-PZ16RR	Dissolved	Water	6010B	
360-37491-5	OC-SW-PZ17RR	Dissolved	Water	6010B	
360-37491-6	OC-SW-PZ18R	Dissolved	Water	6010B	
360-37491-6MS	OC-SW-PZ18R	Dissolved	Water	6010B	
360-37491-6MSD	OC-SW-PZ18R	Dissolved	Water	6010B	

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# **QC Association Summary**

Client: Olin Corporation

Project/Site: Olin Chemical Surfacewater

TestAmerica Job ID: 360-37491-1

# **Metals (Continued)**

## **Analysis Batch: 83420 (Continued)**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37491-7	OC-SW-SD17	Dissolved	Water	6010B	
360-37491-8	OC-SW-PZ18R-DUP	Dissolved	Water	6010B	
LCS 360-83420/1	Lab Control Sample	Total/NA	Water	6010B	
LCSD 360-83420/6	Lab Control Sample Dup	Total/NA	Water	6010B	
MB 360-83420/2	Method Blank	Total/NA	Water	6010B	

# **General Chemistry**

# Analysis Batch: 83244

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37491-1	OC-SW-ISC01	Total/NA	Water	300.0	
360-37491-2	OC-SW-ISC02	Total/NA	Water	300.0	
360-37491-3	OC-SW-ISC03	Total/NA	Water	300.0	
360-37491-3	OC-SW-ISC03	Total/NA	Water	300.0	
360-37491-4	OC-SW-PZ16RR	Total/NA	Water	300.0	
360-37491-5	OC-SW-PZ17RR	Total/NA	Water	300.0	
360-37491-6	OC-SW-PZ18R	Total/NA	Water	300.0	
360-37491-6MS	OC-SW-PZ18R	Total/NA	Water	300.0	
360-37491-6MSD	OC-SW-PZ18R	Total/NA	Water	300.0	
360-37491-7	OC-SW-SD17	Total/NA	Water	300.0	
LCS 360-83244/4	Lab Control Sample	Total/NA	Water	300.0	
MB 360-83244/3	Method Blank	Total/NA	Water	300.0	

## Analysis Batch: 83246

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37491-8	OC-SW-PZ18R-DUP	Total/NA	Water	300.0	
LCS 360-83246/6	Lab Control Sample	Total/NA	Water	300.0	
MB 360-83246/5	Method Blank	Total/NA	Water	300.0	

## Analysis Batch: 83283

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37491-1	OC-SW-ISC01	Total/NA	Water	SM 2510B	
360-37491-2	OC-SW-ISC02	Total/NA	Water	SM 2510B	
360-37491-3	OC-SW-ISC03	Total/NA	Water	SM 2510B	
360-37491-4	OC-SW-PZ16RR	Total/NA	Water	SM 2510B	
360-37491-5	OC-SW-PZ17RR	Total/NA	Water	SM 2510B	
360-37491-6	OC-SW-PZ18R	Total/NA	Water	SM 2510B	
360-37491-6 DU	OC-SW-PZ18R	Total/NA	Water	SM 2510B	
360-37491-7	OC-SW-SD17	Total/NA	Water	SM 2510B	
360-37491-8	OC-SW-PZ18R-DUP	Total/NA	Water	SM 2510B	
LCS 360-83283/1	Lab Control Sample	Total/NA	Water	SM 2510B	
MB 360-83283/3	Method Blank	Total/NA	Water	SM 2510B	

# Analysis Batch: 83371

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method Prep Ba	atcn
360-37491-1	OC-SW-ISC01	Total/NA	Water	300.0	
360-37491-2	OC-SW-ISC02	Total/NA	Water	300.0	
360-37491-3	OC-SW-ISC03	Total/NA	Water	300.0	
360-37491-3	OC-SW-ISC03	Total/NA	Water	300.0	
360-37491-4	OC-SW-PZ16RR	Total/NA	Water	300.0	
360-37491-4	OC-SW-PZ16RR	Total/NA	Water	300.0	
360-37491-5	OC-SW-PZ17RR	Total/NA	Water	300.0	

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TestAmerica Westfield 11/28/2011

# **QC Association Summary**

Client: Olin Corporation

Project/Site: Olin Chemical Surfacewater

TestAmerica Job ID: 360-37491-1

# **General Chemistry (Continued)**

## **Analysis Batch: 83371 (Continued)**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37491-5	OC-SW-PZ17RR	Total/NA	Water	300.0	
360-37491-6	OC-SW-PZ18R	Total/NA	Water	300.0	
360-37491-6MS	OC-SW-PZ18R-MS	Total/NA	Water	300.0	
360-37491-6MSD	OC-SW-PZ18R-MSD	Total/NA	Water	300.0	
360-37491-7	OC-SW-SD17	Total/NA	Water	300.0	
LCS 360-83371/4	Lab Control Sample	Total/NA	Water	300.0	
MB 360-83371/3	Method Blank	Total/NA	Water	300.0	

## Analysis Batch: 83384

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37491-8	OC-SW-PZ18R-DUP	Total/NA	Water	300.0	
LCS 360-83384/6	Lab Control Sample	Total/NA	Water	300.0	
MB 360-83384/5	Method Blank	Total/NA	Water	300.0	

## Prep Batch: 83401

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37491-1	OC-SW-ISC01	Total/NA	Water	Distill/Ammonia	
360-37491-2	OC-SW-ISC02	Total/NA	Water	Distill/Ammonia	
360-37491-3	OC-SW-ISC03	Total/NA	Water	Distill/Ammonia	
360-37491-4	OC-SW-PZ16RR	Total/NA	Water	Distill/Ammonia	
360-37491-5	OC-SW-PZ17RR	Total/NA	Water	Distill/Ammonia	
360-37491-6	OC-SW-PZ18R	Total/NA	Water	Distill/Ammonia	
360-37491-6MS	OC-SW-PZ18R	Total/NA	Water	Distill/Ammonia	
360-37491-6MSD	OC-SW-PZ18R	Total/NA	Water	Distill/Ammonia	
360-37491-7	OC-SW-SD17	Total/NA	Water	Distill/Ammonia	
360-37491-8	OC-SW-PZ18R-DUP	Total/NA	Water	Distill/Ammonia	
LCS 360-83401/2-A	Lab Control Sample	Total/NA	Water	Distill/Ammonia	
MB 360-83401/1-A	Method Blank	Total/NA	Water	Distill/Ammonia	

## **Analysis Batch: 83489**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37491-1	OC-SW-ISC01	Total/NA	Water	L107-06-1B	83401
360-37491-2	OC-SW-ISC02	Total/NA	Water	L107-06-1B	83401
360-37491-3	OC-SW-ISC03	Total/NA	Water	L107-06-1B	83401
360-37491-4	OC-SW-PZ16RR	Total/NA	Water	L107-06-1B	83401
360-37491-5	OC-SW-PZ17RR	Total/NA	Water	L107-06-1B	83401
360-37491-6	OC-SW-PZ18R	Total/NA	Water	L107-06-1B	83401
360-37491-6MS	OC-SW-PZ18R	Total/NA	Water	L107-06-1B	83401
360-37491-6MSD	OC-SW-PZ18R	Total/NA	Water	L107-06-1B	83401
360-37491-7	OC-SW-SD17	Total/NA	Water	L107-06-1B	83401
360-37491-8	OC-SW-PZ18R-DUP	Total/NA	Water	L107-06-1B	83401
LCS 360-83401/2-A	Lab Control Sample	Total/NA	Water	L107-06-1B	83401
MB 360-83401/1-A	Method Blank	Total/NA	Water	L107-06-1B	83401

Client: Olin Corporation

Project/Site: Olin Chemical Surfacewater

TestAmerica Job ID: 360-37491-1

Method: 6010B - Total Metals

Lab Sample ID: MB 360-83100/1-A

**Matrix: Water** 

**Analysis Batch: 83303** 

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Type: Total/NA

Prep Batch: 83100

	IVID	IVID							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		100	13	ug/L		11/09/11 11:49	11/11/11 17:48	1
Chromium	ND		5.0	0.65	ug/L		11/09/11 11:49	11/11/11 17:48	1
Sodium	ND		2000	280	ug/L		11/09/11 11:49	11/11/11 17:48	1

**Client Sample ID: Lab Control Sample** 

80 - 120

100

Lab Sample ID: LCS 360-83100/2-A **Matrix: Water** 

**Analysis Batch: 83303** 

Analyte

Aluminum

Chromium

Sodium

Prep Batch: 83100 Spike LCS LCS Result Qualifier %Rec Added Unit D Limits 5620 5000 ug/L 112 80 - 120 1000 1120 ug/L 112 80 - 120

ug/L

Lab Sample ID: LCSD 360-83100/3-A Client Sample ID: Lab Control Sample Dup **Matrix: Water** Prep Type: Total/NA Prep Batch: 83100

20000

20000

**Analysis Batch: 83303** 

LCSD LCSD Spike RPD %Rec. Analyte Added Result Qualifier Unit D %Rec Limits RPD Limit Aluminum 5000 5820 ug/L 116 80 - 120 20 Chromium 1000 1150 ug/L 80 - 120 115 20 3 20000 Sodium 21400 ug/L 107 80 - 120

Lab Sample ID: 360-37491-6MS

**Matrix: Water** 

Analysis Batch: 83303

Client Sample ID: OC-SW-PZ18R Prep Type: Total/NA

Prep Batch: 83100

	Sample	Sample	Spike	MS	MS				%Rec.	
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Aluminum	270		5000	6080		ug/L		116	75 - 125	
Chromium	22		1000	1170		ug/L		115	75 - 125	
Sodium	88000		20000	107000	4	ug/L		90	75 - 125	

Lab Sample ID: 360-37491-6MSD Client Sample ID: OC-SW-PZ18R

**Matrix: Water** 

**Analysis Batch: 83303** 

Prep Type: Total/NA Prep Batch: 83100

_	Sample	Sample	Spike	MSD	MSD				%Rec.		RPD
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Aluminum	270		5000	5940		ug/L		113	75 - 125	2	20
Chromium	22		1000	1140		ug/L		111	75 - 125	3	20
Sodium	88000		20000	105000	4	ug/L		84	75 - 125	1	20

Lab Sample ID: MB 360-83163/1-A

**Matrix: Water** 

Analysis Batch: 83365

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 83163

	MB	MR							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		100	13	ug/L		11/10/11 08:48	11/14/11 14:28	1
Chromium	ND		5.0	0.65	ug/L		11/10/11 08:48	11/14/11 14:28	1
Sodium	391	J	2000	280	ug/L		11/10/11 08:48	11/14/11 14:28	1

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Client: Olin Corporation

Project/Site: Olin Chemical Surfacewater

TestAmerica Job ID: 360-37491-1

## Method: 6010B - Total Metals (Continued)

Lab Sample ID: LCS 360-83163/2-A

Matrix: Water

Analysis Batch: 83365

Prep Batch: 83163

	Spike	LUG	LUG			/ortec.	
Analyte	Added	Result	Qualifier l	Jnit D	%Rec	Limits	
Aluminum	 5000	5640		ıg/L	113	80 - 120	
Chromium	1000	1100	ι	ıg/L	110	80 - 120	
Sodium	20000	20700	ι	ıg/L	103	80 - 120	

Lab Sample ID: LCSD 360-83163/3-A

Matrix: Water

Analysis Batch: 83365

Spike LCSD LCSD CSD RPD

Analyte Added Result Qualifier Unit D Rec Limits RPD Limit

Analyte	Added	Result	Qualifier Unit	D	%Rec	Limits	RPD	Limit
Aluminum	5000	5440	ug/L		109	80 - 120	4	20
Chromium	1000	1060	ug/L		106	80 - 120	4	20
Sodium	20000	20300	ug/L		101	80 - 120	2	20

## Method: 6010B - Dissolved Metals

Lab Sample ID: MB 360-83420/2

Client Sample ID: Method Blank
Matrix: Water

Prep Type: Total/NA

Analysis Batch: 83420

мв мв MDL Unit Analyte Result Qualifier RL D Prepared Analyzed Dil Fac Aluminum ND 100 11/15/11 16:24 13 ug/L Chromium ND 5.0 0.65 ug/L 11/15/11 16:24 Sodium ND 2000 11/15/11 16:24 280 ug/L

Lab Sample ID: LCS 360-83420/1

Matrix: Water

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

**Analysis Batch: 83420** 

LCS LCS %Rec. Spike Analyte Added Result Qualifier Unit %Rec Limits Aluminum 5000 5210 ug/L 104 80 - 120 1000 1000 Chromium ug/L 100 80 - 120 20000 19500 80 - 120 Sodium ug/L 98

Lab Sample ID: LCSD 360-83420/6

Matrix: Water

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analysis Batch: 83420

LCSD LCSD %Rec. Spike RPD Analyte Added Result Qualifier Unit %Rec Limits Limit Aluminum 5000 5190 104 80 - 120 20 ug/L n Chromium 1000 999 ug/L 100 80 - 120 20 20000 80 - 120 Sodium 19300 ug/L 96 20

Lab Sample ID: 360-37491-6MS Client Sample ID: OC-SW-PZ18R

Matrix: Water

Analysis Batch: 83420

•	Sample	Sample	Spike	MS	MS				%Rec.
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits
Aluminum	170		5000	5420		ug/L		105	75 - 125
Chromium	14		1000	1020		ug/L		100	75 - 125
Sodium	96000		20000	113000	4	ug/L		86	75 - 125

**Prep Type: Dissolved** 

MSD MSD

5420

1020

113000

Result Qualifier

Unit

ug/L

ug/L

ug/L

Spike

babbA

5000

1000

20000

Client: Olin Corporation

Project/Site: Olin Chemical Surfacewater

Method: 6010B - Dissolved Metals (Continued)

Lab Sample ID: 360-37491-6MSD

**Matrix: Water** 

Analyte

Aluminum

Chromium

Sodium

**Analysis Batch: 83420** 

Client Sample ID: OC-SW-PZ18R
Prep Type: Dissolved

 WRec.
 RPD

 Limits
 RPD
 Limit

 105
 75 - 125
 0
 20

75 - 125

75 - 125

Client Sample ID: Method Blank

Client Sample ID: Lab Control Sample

Client Sample ID: OC-SW-PZ18R-MS

Client Sample ID: OC-SW-PZ18R-MSD

Client Sample ID: Method Blank

0

0

Prep Type: Total/NA

Prep Type: Total/NA

Prep Type: Total/NA

Prep Type: Total/NA

20

20

10

100

85

Method: 300.0 - Nitrate & Nitrite

Lab Sample ID: MB 360-83371/3

Matrix: Water

Analysis Batch: 83371

MB MB

Sample Sample

Result

96000

170

14

Qualifier

Analyte Result Qualifier RL RLUnit D Prepared Analyzed Dil Fac Nitrate as N ND 0.050 0.050 mg/L 11/09/11 18:59 Nitrite as N ND 0.010 11/09/11 18:59 0.010 mg/L

Lab Sample ID: LCS 360-83371/4

**Matrix: Water** 

**Analysis Batch: 83371** 

Spike LCS LCS %Rec. Added Qualifier Limits Analyte Result Unit D %Rec Nitrate as N 4.00 3.84 85 - 115 mg/L 96 Nitrite as N 4.00 4.04 mg/L 101 85 - 115

Lab Sample ID: 360-37491-6MS

Matrix: Water

**Analysis Batch: 83371** 

MS MS %Rec. Sample Sample Spike Analyte Qualifier Added Qualifier %Rec Result Result Unit Limits Nitrate as N ND 10.0 10.6 mg/L 106 75 - 125 Nitrite as N ND 10.0 10.5 mg/L 105 75 - 125

Lab Sample ID: 360-37491-6MSD

Matrix: Water

Analysis Batch: 83371

Sample Sample Spike MSD MSD %Rec. RPD Analyte Result Qualifier Added Result Qualifier Unit D %Rec Limits **RPD** Limit Nitrate as N ND 10.0 10.7 mg/L 107 75 <sub>-</sub> 125 20 Nitrite as N ND 10.0 10.5 105 75 - 125 20 mg/L

Lab Sample ID: MB 360-83384/5

Matrix: Water

Analysis Batch: 83384

Prep Type: Total/NA

MB MB

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	ND		0.050	0.050	mg/L			11/10/11 01:58	1
Nitrite as N	ND		0.010	0.010	mg/L			11/10/11 01:58	1

10

TestAmerica Job ID: 360-37491-1

Client: Olin Corporation

Project/Site: Olin Chemical Surfacewater

Method: 300.0 - Nitrate & Nitrite (Continued)

Lab Sample ID: LCS 360-83384/6

**Matrix: Water** 

Analysis Batch: 83384

**Client Sample ID: Lab Control Sample** 

Prep Type: Total/NA

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Nitrate as N	 4.00	3.90		mg/L		98	85 - 115	
Nitrite as N	4.00	4.08		mg/L		102	85 - 115	

Method: 300.0 - Chloride & Sulfate

Lab Sample ID: MB 360-83244/3 Client Sample ID: Method Blank Prep Type: Total/NA

**Matrix: Water** 

Analysis Batch: 83244

	MB	MB								
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac	
Sulfate	ND		2.0	2.0	mg/L			11/09/11 18:59	1	
Chloride	ND		1.0	1.0	ma/l			11/00/11 18:50	1	

Lab Sample ID: LCS 360-83244/4 **Client Sample ID: Lab Control Sample Matrix: Water** Prep Type: Total/NA

Analysis Batch: 83244

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Sulfate	 80.0	81.1		mg/L		101	85 - 115	
Chloride	40.0	40.7		mg/L		102	85 - 115	

Lab Sample ID: 360-37491-6MS Client Sample ID: OC-SW-PZ18R Prep Type: Total/NA

Matrix: Water

Analysis Batch: 83244

	Sample	Sample	Spike	MS	MS				%Rec.		
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits		
Sulfate	120		200	349		mg/L		117	75 - 125		_
Chloride	120		100	239		mg/L		114	75 - 125		

Lab Sample ID: 360-37491-6MSD Client Sample ID: OC-SW-PZ18R Prep Type: Total/NA

**Matrix: Water** 

Analysis Batch: 83244

l		Sample	Sample	Spike	MSD	MSD				%Rec.		RPD
	Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
	Sulfate	120		200	349		mg/L		117	75 - 125	0	20
١	Chloride	120		100	239		mg/L		115	75 - 125	0	20

Lab Sample ID: MB 360-83246/5 Client Sample ID: Method Blank Prep Type: Total/NA

**Matrix: Water** 

Analysis Batch: 83246

_	МВ	MB							
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	ND		2.0	2.0	mg/L			11/10/11 01:58	1

1.0

1.0 mg/L

Lab Sample ID: LCS 360-83246/6 **Client Sample ID: Lab Control Sample** Prep Type: Total/NA

ND

**Matrix: Water** 

Chloride

**Analysis Batch: 83246** 

	Spike	LCS	LCS			%Rec.	
Analyte	Added	Result	Qualifier Unit	D	%Rec	Limits	
Sulfate	80.0	81.6	mg/		102	85 _ 115	

11/10/11 01:58

Client Sample ID: Method Blank

Client Sample ID: Lab Control Sample

Client Sample ID: OC-SW-PZ18R

Prep Type: Total/NA

Prep Type: Total/NA

Prep Type: Total/NA

Prep Type: Total/NA

Prep Batch: 83401

Prep Batch: 83401

Prep Batch: 83401

Client: Olin Corporation

Project/Site: Olin Chemical Surfacewater

Method: 300.0 - Chloride & Sulfate (Continued)

Lab Sample ID: LCS 360-83246/6 Client Sample ID: Lab Control Sample

**Matrix: Water** 

**Analysis Batch: 83246** 

LCS LCS Spike %Rec. Added Result Qualifier D Limits Analyte Unit %Rec Chloride 40.0 102 85 - 115 40.9 mg/L

Method: L107-06-1B - Nitrogen Ammonia

Lab Sample ID: MB 360-83401/1-A

**Matrix: Water** 

Analysis Batch: 83489

MB MB

Result Qualifier RL Analyte RL Unit Prepared Analyzed Dil Fac 0.10 11/15/11 14:32 Ammonia ND 0.10 mg/L 11/16/11 14:50

Lab Sample ID: LCS 360-83401/2-A

**Matrix: Water** 

**Analysis Batch: 83489** 

Spike LCS LCS %Rec. Analyte Added Result Qualifier Unit D %Rec Limits 10.0 10.4 90 - 110 Ammonia mg/L 104

Lab Sample ID: 360-37491-6MS

**Matrix: Water** 

Analysis Batch: 83489

Sample Sample Spike MS MS %Rec Qualifier Added Result Qualifier Unit Analyte Result %Rec Limits Ammonia 30 10.0 41.5 mg/L 119 90 - 110

Lab Sample ID: 360-37491-6MSD

**Matrix: Water** 

**Analysis Batch: 83489** 

Sample Sample Spike Analyte Result Qualifier Added

10.0 30 41.2 F Ammonia mg/L

Method: SM 2510B - Conductivity, Specific Conductance

Lab Sample ID: MB 360-83283/3

**Matrix: Water** 

**Analysis Batch: 83283** 

MB MB

Analyte Result Qualifier RL RI Unit Analyzed Dil Fac D Prepared Specific Conductance ND 1.0 1.0 umhos/cm 11/12/11 09:43

MSD MSD

Result Qualifier

Unit

Lab Sample ID: LCS 360-83283/1

**Matrix: Water** 

**Analysis Batch: 83283** 

Spike LCS LCS %Rec. Added Result Qualifier Limits Analyte Unit %Rec Specific Conductance 1410 1410 umhos/cm 100 85 - 115

> TestAmerica Westfield 11/28/2011

Page 25 of 35

Client Sample ID: OC-SW-PZ18R Prep Type: Total/NA

Prep Batch: 83401 %Rec.

RPD RPD

Limit

20

Client Sample ID: Method Blank

Limits

Client Sample ID: Lab Control Sample

90 - 110

%Rec

116

Prep Type: Total/NA

Prep Type: Total/NA

# **QC Sample Results**

Client: Olin Corporation TestAmerica Job ID: 360-37491-1

Project/Site: Olin Chemical Surfacewater

Method: SM 2510B - Conductivity, Specific Conductance (Continued)

Lab Sample ID: 360-37491-6 DU

Client Sample ID: OC-SW-PZ18R

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 83283

	Sample	Sample	DU	DU					RPD
Analyte	Result	Qualifier	Result	Qualifier	Unit	D	R	RPD	Limit
Specific Conductance	780		774		umhos/cm			0.1	20

2

4

5

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## **Lab Chronicle**

Client: Olin Corporation

Project/Site: Olin Chemical Surfacewater

TestAmerica Job ID: 360-37491-1

Lab Sample ID: 360-37491-1

Matrix: Water

Matrix: Water

**Matrix: Water** 

Lab Sample ID: 360-37491-3

Client Sample ID: OC-SW-ISC01

Date Collected: 11/08/11 12:45 Date Received: 11/08/11 17:10

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			83100	11/09/11 11:49	OG	TAL WFD
Total/NA	Analysis	6010B		1	83303	11/11/11 18:17	TJS	TAL WFD
Dissolved	Analysis	6010B		1	83420	11/15/11 17:05	TJS	TAL WFD
Total/NA	Analysis	300.0		10	83244	11/10/11 00:37	RWE	TAL WFD
Total/NA	Analysis	SM 2510B		1	83283	11/12/11 09:52	AMS	TAL WFD
Total/NA	Analysis	300.0		1	83371	11/10/11 00:24	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			83401	11/15/11 14:32	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		10	83489	11/16/11 15:18	RWE	TAL WFD

Client Sample ID: OC-SW-ISC02 Lab Sample ID: 360-37491-2

Date Collected: 11/08/11 11:45

Date Received: 11/08/11 17:10

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			83100	11/09/11 11:49	OG	TAL WFD
Total/NA	Analysis	6010B		1	83303	11/11/11 18:20	TJS	TAL WFD
Dissolved	Analysis	6010B		1	83420	11/15/11 17:08	TJS	TAL WFD
Total/NA	Analysis	300.0		10	83244	11/09/11 20:52	RWE	TAL WFD
Total/NA	Analysis	SM 2510B		1	83283	11/12/11 09:53	AMS	TAL WFD
Total/NA	Analysis	300.0		1	83371	11/09/11 20:36	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			83401	11/15/11 14:32	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		10	83489	11/16/11 15:19	RWE	TAL WFD

Client Sample ID: OC-SW-ISC03

Date Collected: 11/08/11 11:30

Date Received: 11/08/11 17:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	6010B		1	83303	11/11/11 18:23	TJS	TAL WFD
Dissolved	Analysis	6010B		1	83420	11/15/11 17:11	TJS	TAL WFD
Total/NA	Analysis	300.0		1	83244	11/09/11 20:02	RWE	TAL WFD
Total/NA	Analysis	300.0		10	83244	11/09/11 20:20	RWE	TAL WFD
Total/NA	Analysis	SM 2510B		1	83283	11/12/11 09:54	AMS	TAL WFD
Total/NA	Analysis	300.0		1	83371	11/09/11 20:03	RWE	TAL WFD
Total/NA	Analysis	300.0		10	83371	11/09/11 20:20	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			83401	11/15/11 14:32	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		1	83489	11/16/11 14:57	RWE	TAL WFD

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#### **Lab Chronicle**

Client: Olin Corporation

Project/Site: Olin Chemical Surfacewater

Lab Sample ID: 360-37491-4

TestAmerica Job ID: 360-37491-1

Client Sample ID: OC-SW-PZ16RR

Date Collected: 11/08/11 11:55 Matrix: Water

Date Received: 11/08/11 17:10

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			83100	11/09/11 11:49	OG	TAL WFD
Total/NA	Analysis	6010B		1	83303	11/11/11 18:26	TJS	TAL WFD
Dissolved	Analysis	6010B		1	83420	11/15/11 17:18	TJS	TAL WFD
Total/NA	Analysis	300.0		10	83244	11/09/11 21:24	RWE	TAL WFD
Total/NA	Analysis	SM 2510B		1	83283	11/12/11 09:56	AMS	TAL WFD
Total/NA	Analysis	300.0		10	83371	11/09/11 21:24	RWE	TAL WFD
Total/NA	Analysis	300.0		1	83371	11/09/11 21:08	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			83401	11/15/11 14:32	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		10	83489	11/16/11 15:20	RWE	TAL WFD

Client Sample ID: OC-SW-PZ17RR Lab Sample ID: 360-37491-5

Date Collected: 11/08/11 12:10 Matrix: Water

Date Received: 11/08/11 17:10

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			83100	11/09/11 11:49	OG	TAL WFD
Total/NA	Analysis	6010B		1	83303	11/11/11 18:29	TJS	TAL WFD
Dissolved	Analysis	6010B		1	83420	11/15/11 17:21	TJS	TAL WFD
Total/NA	Analysis	300.0		10	83244	11/09/11 23:01	RWE	TAL WFD
Total/NA	Analysis	SM 2510B		1	83283	11/12/11 09:57	AMS	TAL WFD
Total/NA	Analysis	300.0		1	83371	11/09/11 22:44	RWE	TAL WFD
Total/NA	Analysis	300.0		10	83371	11/09/11 23:01	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			83401	11/15/11 14:32	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		10	83489	11/16/11 15:21	RWE	TAL WFD

Client Sample ID: OC-SW-PZ18R

Date Collected: 11/08/11 12:30

Lab Sample ID: 360-37491-6

Matrix: Water

Date Received: 11/08/11 17:10

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			83100	11/09/11 11:49	OG	TAL WFD
Total/NA	Analysis	6010B		1	83303	11/11/11 17:57	TJS	TAL WFD
Dissolved	Analysis	6010B		1	83420	11/15/11 16:47	TJS	TAL WFD
Total/NA	Analysis	300.0		10	83244	11/09/11 23:33	RWE	TAL WFD
Total/NA	Analysis	SM 2510B		1	83283	11/12/11 10:03	AMS	TAL WFD
Total/NA	Analysis	300.0		1	83371	11/09/11 23:17	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			83401	11/15/11 14:32	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		10	83489	11/16/11 15:15	RWE	TAL WFD

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#### **Lab Chronicle**

Client: Olin Corporation

Project/Site: Olin Chemical Surfacewater

Lab Cample ID: 200 27404 7

TestAmerica Job ID: 360-37491-1

Lab Sample ID: 360-37491-7

Matrix: Water

Client Sample ID: OC-SW-SD17 Date Collected: 11/08/11 12:20

Date Received: 11/08/11 17:10

Batch Batch Dilution Batch Prepared Prep Type Туре Method Run Factor Number or Analyzed Analyst Lab Total/NA Prep 3010A 83163 11/10/11 08:48 OG TAL WFD Total/NA 6010B 83365 11/14/11 15:00 TJS TAL WFD Analysis 1 Dissolved Analysis 6010B 83420 11/15/11 17:24 TJS TAL WFD 1 Total/NA 300.0 83244 11/10/11 01:09 RWE TAL WFD Analysis 10 Total/NA Analysis SM 2510B 1 83283 11/12/11 10:06 AMS TAL WFD Total/NA Analysis 300.0 83371 11/10/11 00:53 RWE TAL WFD Distill/Ammonia 83401 RWE TAL WFD Total/NA Prep 11/15/11 14:32 Total/NA Analysis L107-06-1B 10 83489 11/16/11 15:22 **RWE** TAL WFD

Client Sample ID: OC-SW-PZ18R-DUP

Lab Sample ID: 360-37491-8

Date Collected: 11/08/11 12:30 Matrix: Water

Date Received: 11/08/11 17:10

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			83163	11/10/11 08:48	OG	TAL WFD
Total/NA	Analysis	6010B		1	83365	11/14/11 14:52	TJS	TAL WFD
Dissolved	Analysis	6010B		1	83420	11/15/11 17:26	TJS	TAL WFD
Total/NA	Analysis	300.0		10	83246	11/10/11 02:46	RWE	TAL WFD
Total/NA	Analysis	SM 2510B		1	83283	11/12/11 10:08	AMS	TAL WFD
Total/NA	Analysis	300.0		1	83384	11/10/11 02:30	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			83401	11/15/11 14:32	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		10	83489	11/16/11 15:25	RWE	TAL WFD

Laboratory References:

TAL WFD = TestAmerica Westfield, Westfield Executive Park, 53 Southampton Road, Westfield, MA 01085, TEL (413)572-4000

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# **Certification Summary**

Client: Olin Corporation

Project/Site: Olin Chemical Surfacewater

TestAmerica Job ID: 360-37491-1

Laboratory	Authority	Program	EPA Region	Certification ID
TestAmerica Westfield	Connecticut	State Program	1	PH-0494
TestAmerica Westfield	Maine	State Program	1	MA00014
TestAmerica Westfield	Massachusetts	State Program	1	M-MA014
TestAmerica Westfield	New Hampshire	NELAC	1	2539
TestAmerica Westfield	New York	NELAC	2	10843
TestAmerica Westfield	North Carolina	North Carolina DENR	4	647
TestAmerica Westfield	Rhode Island	State Program	1	LAO00057
TestAmerica Westfield	Vermont	State Program	1	VT-10843

Accreditation may not be offered or required for all methods and analytes reported in this package. Please contact your project manager for the laboratory's current list of certified methods and analytes.

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		State v	where <b>Primary</b> A	ccreditation is	Carried
		New	oro i illiai y F	.corounation is	- Carriou
		Hampshire			North
Method Name	Description	(NELAC)	Mass	Conn	Carolina
821-R-02-012	Toxicity, Acute (48-Hour)(list upon request)	NP	NB		
SM 4500 CI F	Chlorine, Residual		NP P		
SM 9215E SM 9222D	Heterotrophic Plate Count (SimPlate)		P/NP		
	Coliforms, Fecal (Membrane Filter)		P/NP P		
SM 9223 SM 9224	Coliforms, Total, and E.Coli (Colilert-P/A)		P P		
	Coliforms, Total, and E.Coli (Enumeration)  E.coli				
1103.1 Enterolert	Enterococcus	<del></del>	ambient/		
200.8 Rev 5.4	Metals (ICP/MS) (list upon request)	NP/P	source NP/P		
200.6 Rev 5.4 200.7 Rev 4.4	, , , , , , , , ,	NP/P	NP/P		
6010B	Metals (ICP)(list upon request)  Metals (ICP)(list upon request)	NP/SW	141 /1		
245.1	Mercury (CVAA)	NP/P	NP		
7470A	Mercury (CVAA)	NP	141		
7471A	Mercury (CVAA)	SW			
SM 2340B	Total Hardness (as CaCO3) by calculation	NP/P	NP		
3005A	Preparation, Total Recoverable or Dissolved Metals	NP/P			
3010A	Preparation, Total Metals	NP/P			
3020A	Preparation, Total Metals	NP/P/SW			1
3050B	Preparation, Metals	SW			
504.1	EDB, DBCP and 1,2,3-TCP (GC)	P	Р		1
608	Organochlorine Pest/PCBs (list upon request)	NP	NP		
625	Semivolatile Org Comp (GC/MS)(list upon request)	NP	NP		
3546	Microwave Extraction	SW			
3510C	Liquid-Liquid Extraction (Separatory Funnel)	NP.			
3550B	Ultrasonic Extraction	SW			
8081A	Organochlorine Pesticides (GC)(list upon request)	NP/SW			
8082	PCBs by Gas Chromatography(list upon request)	NP/SW			
8270C	Semivolatile Comp.(GC/MS)(list upon request)	NP/SW			
CT ETPH	Conn - Ext. Total petroleum Hydrocarbons (GC)	17611		NP/SW	
MA-EPH	Mass - Extractable Petroleum Hydrocarbons (GC)			,	NP/SW
524.2	Volatile Org Comp (GC/MS)(list upon request)	Р	Р		,
524.2	Trihalomethane compounds	P	P		
624	Volatile Org Comp (GC/MS)(list upon request)	NP	NP		
5035	Closed System Purge and Trap	SW			
5030B	Purge and Trap	NP			
8260B	Volatile Org Comp. (GC/MS)(list upon request)	NP/SW			
MAVPH	Mass - Volatile Petroleum Hydrocarbons (GC)				NP/SW
180.1	Turbidity, Nephelometric	Р	Р		
300	Anions, Ion Chromatography	NP/P	NP/P		
410.4	COD	NP	NP		
1010	Ignitability, Pensky-Martens Closed-Cup Method	SW			
10-107-06-2	Nitrogen, Total Kjeldahl	NP	NP		
7196A	Chromium, Hexavalent	NP/SW			
9012A	Cyanide, Total and/or Amenable	NP/SW			
9030B	Sulfide, Distillation (Acid Soluble and Insoluble)	NP			
9045C	pH	SW			
L107041C	Nitrogen, Nitrate	NP	Р		
L107-06-1B	Nitrogen Ammonia	NP	NP		i
L204001A CN	Cyanide, Total	Р	NP/P		
L210-001A	Phenolics, Total Recoverable	NP	NP		
SM 2320B	Alkalinity	NP/P	NP/P		
SM 2510B	Conductivity, Specific Conductance	NP/P	NP/P		
SM 2540C	Solids, Total Dissolved (TDS)	NP/P	NP/P		i
SM 2540D	Solids, Total Suspended (TSS)	NP	NP		i
SM 3500 CR D	Chromium, Hexavalent	NP			
SM 4500 H+ B	pH	NP/P	NP/P		i
SM 4500 NO2 B	Nitrogen, Nitrite	NP	Р		
SM 4500 P E	Phosphorus, Orthophosphate	NP/P	NP		1
SM 4500 P E	Phosphorus, Total	NP	NP		
SM 4500 S2 D	Sulfide, Total	NP			
OM FOLOD	BOD, 5-Day	NP	NP		İ
SM 5210B	BOD, 5-Day				

Not all organic compounds are accreditied under NELAC

For methods with multiple compounds all compounds may not meet NELAC criteria, listing should be obtained from the laboratory The lab carries additional accreditations with several states. This is the laboratories typical listing but is subject to change based on the laboratories current certification standing.

# **Login Sample Receipt Checklist**

Client: Olin Corporation Job Number: 360-37491-1

Login Number: 37491 List Source: TestAmerica Westfield

List Number: 1

Creator: Ard, Vanessa L

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Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	N/A	
The cooler's custody seal, if present, is intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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entries completed by day [ new page each day] Carl **Analytical Dilution Preparation Log** Analyst Initials 11-8-11 30000 Method 50 18xx E LIMs Sample ID 500 S U 40 Rpt'd Dil. X Sample Aliquot 1 July  $\widetilde{0}$ 727 Units Sample Aliquot 2 Units Serial Dilution Final Volume 2 Units Comments

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TestAmerica Westfield

entries completed by day [ new page each day] Citi **Analytical Dilution Preparation Log** Analyst Initials 1-2-1 Date 3000 Method らなれてなら 50 BHTE LIMs Sample ID 63 80 06 40 0 S U 70 70 みる (SX Rpt'd Dil. У У Sample Aliquot 1 6 721 And M 3 Final Volume 1 6 0 Õ art PY L 727 Units Sample Aliquot 2 Units Serial Dilution Final Volume 2 Date: Units ハーラーハ Comments

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TestAmerica Westfield

TestAmerica Westfield Westfield Executive Park 53 Southampton Road Westfield, MA 01085	3	Chain of Custody Record	ody Record		TestAmerica THE EADER IN ENVIRONMENTAL TESTING
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James Carporell					
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LANE Y	TAT Requested (days):		- <del>2</del> 8 1		B - NaOH M - Hexane C - Zn Acetate N - None
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02-5W-P218R-MSD	→   1230   →	ァ ら シ	X X X X X	35-1	<b>&gt;</b>
Identification			Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)	assessed if samples are retai	tained longer than 1 month)
Other (specify)			Requireme		
Relinquished by School Company	Date/Time.	Company	Received by:	Date/Time:	LS(S Company
Reinquisned by And	100	Company	P P Tide	Date/Time #	/ MM Campany
Reinquished-by.		Company Rec	Received by:	Date/Time;	Company , )
Custody Seals Intact: Custody Seal No.:		Ö	Cooler Temperature(s) °C and Opper Remarks	1741 001	70///
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TAL-8245-360 0310



# **FILE COPY**

# <u>TestAmerica</u>

THE LEADER IN ENVIRONMENTAL TESTING

# ANALYTICAL REPORT

TestAmerica Laboratories, Inc. TestAmerica Westfield Westfield Executive Park 53 Southampton Road Westfield, MA 01085 Tel: (413)572-4000

CHECKED FOR COMPLETENESS
OF PARAMETERS ORDERED BY:

TestAmerica Job ID: 360-37526-1

Client Project/Site: Olin Chemical Semiannual

For:

Olin Corporation PO BOX 248 Charleston, Tennessee 37310-0248

Attn: Mr. James Cashwell

OR Rumold

Authorized for release by: 12/2/2011 1:54:35 PM

Chris Reynolds

QA Manager

chris.reynolds@testamericainc.com

Designee for

Becky Mason

Project Manager II

becky.mason@testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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#### **Case Narrative**

Client: Olin Corporation

Project/Site: Olin Chemical Semiannual

TestAmerica Job ID: 360-37526-1

Job ID: 360-37526-1

#### **Laboratory: TestAmerica Westfield**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

#### RECEIPT

The samples were received on 11/10/2011; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 0.8 C.

Note: All samples that require thermal preservation are considered acceptable if the arrival temperature is within the method's specified temperature range or for general analysis, ranging from 6°C to just above the freezing temperature of water. Samples that are hand delivered, immediately following collection, may not meet these criteria; however, they will be considered acceptable according to NELAC and State standards, if there is evidence that the chilling process has begun, such as stored and transported to the laboratory on ice.

#### **DISSOLVED METALS**

Samples OC-GW-78S (360-37526-1), OC-GW-35S (360-37526-2), OC-GW-201S (360-37526-3), OC-GW-201S-DUP (360-37526-4), OC-GW-79S (360-37526-5), OC-PZ-16RR (360-37526-6), OC-PZ-17RR (360-37526-7) and OC-PZ-18R (360-37526-8) were analyzed for dissolved metals in accordance with EPA SW-846 Method 6010B. The samples were analyzed on 11/15/2011.

Per client request an abbreviated/modified MCP compound list was reported.

No difficulties were encountered during the dissolved metals analyses.

All quality control parameters were within the acceptance limits.

#### **SPECIFIC CONDUCTIVITY**

Samples OC-GW-78S (360-37526-1), OC-GW-35S (360-37526-2), OC-GW-201S (360-37526-3), OC-GW-201S-DUP (360-37526-4), OC-GW-79S (360-37526-5), OC-PZ-16RR (360-37526-6), OC-PZ-17RR (360-37526-7) and OC-PZ-18R (360-37526-8) were analyzed for specific conductivity in accordance with SM20 2510B. The samples were analyzed on 11/12/2011 and 11/19/2011.

No difficulties were encountered during the conductivity analyses.

All quality control parameters were within the acceptance limits.

#### ANIONS (28 DAY HOLD TIME)

Samples OC-GW-78S (360-37526-1), OC-GW-35S (360-37526-2), OC-GW-201S (360-37526-3), OC-GW-201S-DUP (360-37526-4), OC-GW-79S (360-37526-5), OC-PZ-16RR (360-37526-6), OC-PZ-17RR (360-37526-7) and OC-PZ-18R (360-37526-8) were analyzed for anions (28 day hold time) in accordance with EPA Method 300.0. The samples were analyzed on 11/19/2011, 11/24/2011, 11/28/2011, 11/29/2011 and 12/01/2011.

Sulfate failed the recovery criteria low for the MSD of sample OC-GW-201SMSD (360-37526-3) in batch 360-84080.

Refer to the QC report for details.

Samples OC-GW-78S (360-37526-1)[10X], OC-GW-35S (360-37526-2)[10X], OC-GW-201S (360-37526-3)[10X], OC-GW-201S (360-37526-3)[20X], OC-GW-201S-DUP (360-37526-4)[10X], OC-GW-201S-DUP (360-37526-4)[20X], OC-GW-79S (360-37526-5)[10X], OC-GW-79S (360-37526-5)[20X], OC-PZ-16RR (360-37526-6)[10X], OC-PZ-16RR (360-37526-6)[20X], OC-PZ-17RR (360-37526-7)[10X] and OC-PZ-18R (360-37526-8)[10X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

#### **Case Narrative**

Client: Olin Corporation

Project/Site: Olin Chemical Semiannual

TestAmerica Job ID: 360-37526-1

#### Job ID: 360-37526-1 (Continued)

#### Laboratory: TestAmerica Westfield (Continued)

No other difficulties were encountered during the anions analyses.

All other quality control parameters were within the acceptance limits.

#### **AMMONIA**

Samples OC-GW-78S (360-37526-1), OC-GW-35S (360-37526-2), OC-GW-201S (360-37526-3), OC-GW-201S-DUP (360-37526-4), OC-GW-79S (360-37526-5), OC-PZ-16RR (360-37526-6), OC-PZ-17RR (360-37526-7) and OC-PZ-18R (360-37526-8) were analyzed for ammonia in accordance with Lachat 107-06-1B. The samples were prepared on 11/22/2011 and 11/23/2011 and analyzed on 11/23/2011.

Ammonia failed the recovery criteria high for the MS of sample OC-GW-201SMS (360-37526-3) in batch 360-83912.

Ammonia failed the recovery criteria high for the MSD of sample OC-PZ-18RMSD (360-37526-8) in batch 360-83913. The presence of the '4' qualifier in the report indicates analytes where the concentration in the unspiked sample exceeded four times the spiking amount.

Refer to the QC report for details.

Samples OC-GW-78S (360-37526-1)[10X], OC-GW-35S (360-37526-2)[10X], OC-GW-201S (360-37526-3)[10X], OC-GW-201S-DUP (360-37526-4)[10X], OC-GW-79S (360-37526-5)[10X], OC-PZ-16RR (360-37526-6)[50X], OC-PZ-17RR (360-37526-7)[10X] and OC-PZ-18R (360-37526-8)[10X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No other difficulties were encountered during the ammonia analyses.

All other quality control parameters were within the acceptance limits.

TestAmerica Job ID: 360-37526-1

Lab Sample ID: 360-37526-3

Lab Sample ID: 360-37526-4

Lab Sample ID: 360-37526-5

Client: Olin Corporation

Project/Site: Olin Chemical Semiannual

Client Sample ID: OC-GW-78S	Lab Sample ID: 360-37526-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	2.6	J	5.0	0.65	ug/L	1	_	6010B	Dissolved
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	450		20	20	mg/L	10	_	300.0	Total/NA
Chloride	27		1.0	1.0	mg/L	1		300.0	Total/NA
Ammonia	52		1.0	1.0	mg/L	10		L107-06-1B	Total/NA
Specific Conductance	1300		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

#### Client Sample ID: OC-GW-35S Lab Sample ID: 360-37526-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	26	J	100	13	ug/L	1	_	6010B	Dissolved
Chromium	21		5.0	0.65	ug/L	1		6010B	Dissolved
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	200		20	20	mg/L	10	_	300.0	Total/NA
Chloride	6.7		1.0	1.0	mg/L	1		300.0	Total/NA
Ammonia	37		1.0	1.0	mg/L	10		L107-06-1B	Total/NA
Specific Conductance	1000		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

#### Client Sample ID: OC-GW-201S

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	16		5.0	0.65	ug/L	1	_	6010B	Dissolved
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	1400		40	40	mg/L	20		300.0	Total/NA
Chloride	77		10	10	mg/L	10		300.0	Total/NA
Ammonia	180		1.0	1.0	mg/L	10		L107-06-1B	Total/NA
Specific Conductance	3100		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

#### Client Sample ID: OC-GW-201S-DUP

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	16		5.0	0.65	ug/L	1	_	6010B	Dissolved
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	1300		40	40	mg/L	20	_	300.0	Total/NA
Chloride	81		10	10	mg/L	10		300.0	Total/NA
Ammonia	150		1.0	1.0	mg/L	10		L107-06-1B	Total/NA
Specific Conductance	3100		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

### Client Sample ID: OC-GW-79S

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	13	J	100	13	ug/L	1	_	6010B	Dissolved
Chromium	9.0		5.0	0.65	ug/L	1		6010B	Dissolved
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	1200		40	40	mg/L	20	_	300.0	Total/NA
Chloride	140		10	10	mg/L	10		300.0	Total/NA
Ammonia	110		1.0	1.0	mg/L	10		L107-06-1B	Total/NA
Specific Conductance	2800		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

#### Client Sample ID: OC-PZ-16RR

Lab Sample ID: 360-37526-6

# **Detection Summary**

Client: Olin Corporation

Project/Site: Olin Chemical Semiannual

Client Sample ID: OC-PZ-16RR (Continued)

TestAmerica Job ID: 360-37526-1

Lab Sample ID: 360-37526-6

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Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	ט	Method	Prep Type
Chromium	7.2		5.0	0.65	ug/L	1		6010B	Dissolved
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	1100		40	40	mg/L	20	_	300.0	Total/NA
Chloride	170		10	10	mg/L	10		300.0	Total/NA
Ammonia	250		5.0	5.0	mg/L	50		L107-06-1B	Total/NA
Specific Conductance	3000		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

Client Sample ID: OC-PZ-17RR	Lab Sample ID: 360-37526-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	7.3		5.0	0.65	ug/L	1	_	6010B	Dissolved
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	400		20	20	mg/L	10	_	300.0	Total/NA
Chloride	24		1.0	1.0	mg/L	1		300.0	Total/NA
Ammonia	48		1.0	1.0	mg/L	10		L107-06-1B	Total/NA
Specific Conductance	1300		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

# Client Sample ID: OC-PZ-18R Lab Sample ID: 360-37526-8

Analyte	Result Qualifie	er RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium		5.0	0.65	ug/L	1	_	6010B	Dissolved
Analyte	Result Qualifie	er RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	200		20	mg/L	10	_	300.0	Total/NA
Chloride	150	10	10	mg/L	10		300.0	Total/NA
Ammonia	62	1.0	1.0	mg/L	10		L107-06-1B	Total/NA
Specific Conductance	1200	1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

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# **Method Summary**

Client: Olin Corporation

Project/Site: Olin Chemical Semiannual

TestAmerica Job ID: 360-37526-1

Method	Method Description	Protocol	Laboratory
6010B	Dissolved Metals	SW846	TAL WFD
300.0	Chloride & Sulfate	40CFR136A	TAL WFD
L107-06-1B	Nitrogen Ammonia	LACHAT	TAL WFD
SM 2510B	Conductivity Specific Conductance	SM	TAI WFD

#### **Protocol References:**

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.

LACHAT = LACHAT

SM = "Standard Methods For The Examination Of Water And Wastewater",

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

#### Laboratory References:

TAL WFD = TestAmerica Westfield, Westfield Executive Park, 53 Southampton Road, Westfield, MA 01085, TEL (413)572-4000

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# **Sample Summary**

Client: Olin Corporation

Project/Site: Olin Chemical Semiannual

TestAmerica Job ID: 360-37526-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
360-37526-1	OC-GW-78S	Water	11/09/11 11:40	11/10/11 18:20
360-37526-2	OC-GW-35S	Water	11/09/11 14:05	11/10/11 18:20
360-37526-3	OC-GW-201S	Water	11/09/11 09:20	11/10/11 18:20
360-37526-4	OC-GW-201S-DUP	Water	11/09/11 09:20	11/10/11 18:20
360-37526-5	OC-GW-79S	Water	11/09/11 10:20	11/10/11 18:20
360-37526-6	OC-PZ-16RR	Water	11/09/11 10:30	11/10/11 18:20
360-37526-7	OC-PZ-17RR	Water	11/09/11 12:00	11/10/11 18:20
360-37526-8	OC-PZ-18R	Water	11/09/11 12:55	11/10/11 18:20

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TestAmerica Job ID: 360-37526-1

Client: Olin Corporation

Project/Site: Olin Chemical Semiannual

Method: 6010B - Dissolved Metals - Dissolved

Client Sample ID: OC-GW-78S Lab Sample ID: 360-37526-1

Date Collected: 11/09/11 11:40 **Matrix: Water** 

Date Received: 11/10/11 18:20

Analyte Result Qualifier RL MDL Unit D Prepared Analyzed Dil Fac ND 100 Aluminum 13 ug/L 11/15/11 17:47 5.0 Chromium 2.6 J 0.65 ug/L 11/15/11 17:47

Client Sample ID: OC-GW-35S Lab Sample ID: 360-37526-2

Date Collected: 11/09/11 14:05 Date Received: 11/10/11 18:20

Analyte Result Qualifier RL MDL Unit D Prepared Analyzed Dil Fac 100 Aluminum 26 13 ug/L 11/15/11 17:50 Chromium 21 5.0 0.65 ug/L 11/15/11 17:50

Client Sample ID: OC-GW-201S Lab Sample ID: 360-37526-3

Date Collected: 11/09/11 09:20 **Matrix: Water** 

Date Received: 11/10/11 18:20

Analyte Result Qualifier RL MDL Unit D Dil Fac Prepared Analyzed 100 Aluminum ND 13 ug/L 11/15/11 17:29 5.0 Chromium 16 0.65 ug/L 11/15/11 17:29

Client Sample ID: OC-GW-201S-DUP Lab Sample ID: 360-37526-4

Date Collected: 11/09/11 09:20

Date Received: 11/10/11 18:20

Analyte Result Qualifier RL MDL Unit D Prepared Analyzed Dil Fac Aluminum ND 100 11/15/11 17:53 13 ug/L Chromium 16 5.0 0.65 ug/L 11/15/11 17:53

Client Sample ID: OC-GW-79S Lab Sample ID: 360-37526-5 Date Collected: 11/09/11 10:20

Date Received: 11/10/11 18:20

Result Qualifier RL MDL Unit D Dil Fac Analyte Prepared Analyzed 100 13 13 ug/L 11/15/11 17:56 **Aluminum** J 5.0 11/15/11 17:56 Chromium 9.0 0.65 ug/L

Client Sample ID: OC-PZ-16RR Lab Sample ID: 360-37526-6

Date Collected: 11/09/11 10:30

Date Received: 11/10/11 18:20

Analyte Result Qualifier RL MDL Unit D Prepared Analyzed Dil Fac Aluminum ND 100 13 ug/L 11/15/11 17:59 Chromium 7.2 5.0 0.65 ug/L 11/15/11 17:59

Client Sample ID: OC-PZ-17RR Lab Sample ID: 360-37526-7

Date Collected: 11/09/11 12:00

Date Received: 11/10/11 18:20

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND	-	100	13	ua/L			11/15/11 18:02	1

TestAmerica Westfield 12/2/2011

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**Matrix: Water** 

**Matrix: Water** 

**Matrix: Water** 

**Matrix: Water** 

**Matrix: Water** 

# **Client Sample Results**

Client: Olin Corporation

TestAmerica Job ID: 360-37526-1 Project/Site: Olin Chemical Semiannual

Method: 6010B - Dissolved Metals - Dissolved (Continued)

Client Sample ID: OC-PZ-17RR Lab Sample ID: 360-37526-7 Date Collected: 11/09/11 12:00 **Matrix: Water** 

Date Received: 11/10/11 18:20

Analyte Result Qualifier RL MDL Unit D Dil Fac Prepared Analyzed 5.0 11/15/11 18:02 0.65 ug/L Chromium 7.3

Client Sample ID: OC-PZ-18R Lab Sample ID: 360-37526-8

Date Collected: 11/09/11 12:55 Date Received: 11/10/11 18:20

Result Qualifier RL MDL Unit D Analyzed Dil Fac Analyte Prepared ND 100 Aluminum 13 ug/L 11/15/11 18:05 Chromium 11 5.0 0.65 ug/L 11/15/11 18:05

**Matrix: Water** 

Client: Olin Corporation

Project/Site: Olin Chemical Semiannual

**General Chemistry** 

Client Sample ID: OC-GW-78S

Date Collected: 11/09/11 11:40

Lab Sample ID: 360-37526-1

**Matrix: Water** 

Date Received: 11/10/11 18:20

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	450		20	20	mg/L			11/29/11 00:03	10
Chloride	27		1.0	1.0	mg/L			11/19/11 20:20	1
Ammonia	52		1.0	1.0	mg/L		11/22/11 11:45	11/23/11 14:52	10
Specific Conductance	1300		1.0	1.0	umhos/cm			11/12/11 10:09	1

Lab Sample ID: 360-37526-2

Matrix: Water

**Matrix: Water** 

Date Collected: 11/09/11 14:05 Date Received: 11/10/11 18:20

Client Sample ID: OC-GW-35S

Analyte Result Qualifier RL**RL** Unit D Prepared Analyzed Dil Fac Sulfate 200 20 20 mg/L 11/29/11 00:19 10 1.0 11/19/11 20:36 1.0 mg/L 1 Chloride 6.7 **Ammonia** 1.0 1.0 mg/L 11/22/11 11:45 11/23/11 14:53 10 37 1.0 1.0 umhos/cm 11/12/11 10:10 **Specific Conductance** 1000

Client Sample ID: OC-GW-201S Lab Sample ID: 360-37526-3

Date Collected: 11/09/11 09:20 Matrix: Water

Date Received: 11/10/11 18:20

Result Qualifier Analyte RL **RL** Unit D Prepared Analyzed Dil Fac 11/28/11 20:49 Sulfate 1400 40 40 mg/L 20 10 10 11/19/11 11:44 10 Chloride mg/L 77 11/22/11 11:45 1.0 1.0 mg/L 11/23/11 14:48 10 180 **Ammonia Specific Conductance** 3100 1.0 umhos/cm 11/19/11 08:20

Client Sample ID: OC-GW-201S-DUP

Lab Sample ID: 360-37526-4

Date Collected: 11/09/11 09:20 Date Received: 11/10/11 18:20

Result Qualifier Analyte RL RL Unit D Prepared Analyzed Dil Fac Sulfate 1300 40 40 mg/L 11/28/11 23:14 20 10 10 11/28/11 22:58 10 Chloride 81 mg/L **Ammonia** 150 1.0 mg/L 11/22/11 11:45 11/23/11 14:54 10 **Specific Conductance** 3100 1.0 1.0 umhos/cm 11/12/11 10:12

Client Sample ID: OC-GW-79S Lab Sample ID: 360-37526-5

Date Collected: 11/09/11 10:20 Matrix: Water

Date Received: 11/10/11 18:20

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	1200		40	40	mg/L			11/24/11 10:52	20
Chloride	140		10	10	mg/L			11/24/11 10:36	10
Ammonia	110		1.0	1.0	mg/L		11/22/11 11:45	11/23/11 14:55	10
Specific Conductance	2800		1.0	1.0	umhos/cm			11/12/11 10:13	1

# **Client Sample Results**

Client: Olin Corporation

Project/Site: Olin Chemical Semiannual

TestAmerica Job ID: 360-37526-1

#### **General Chemistry**

Client Sample ID: OC-PZ-16RR Date Collected: 11/09/11 10:30

Lab Sample ID: 360-37526-6

**Matrix: Water** 

Date Received: 11/10/11 18:20

Analyte	Result Qualifier	RL	RL Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	1100	40	40 mg/L			11/24/11 11:25	20
Chloride	170	10	10 mg/L			11/24/11 11:08	10
Ammonia	250	5.0	5.0 mg/L		11/22/11 11:45	11/23/11 15:11	50
Specific Conductance	3000	1.0	1.0 umhos/cm			11/12/11 10:15	1

Lab Sample ID: 360-37526-7

Date Collected: 11/09/11 12:00 Date Received: 11/10/11 18:20

Client Sample ID: OC-PZ-17RR

**Matrix: Water** 

Analyte Result Qualifier RLRL Unit Prepared Analyzed Dil Fac Sulfate 400 20 20 mg/L 12/01/11 17:52 1.0 11/19/11 07:42 Chloride 1.0 mg/L 1 24 **Ammonia** 48 1.0 1.0 mg/L 11/22/11 11:45 11/23/11 14:57 10

1300

1.0

1.0 umhos/cm

Lab Sample ID: 360-37526-8

11/12/11 10:16

**Matrix: Water** 

Date Collected: 11/09/11 12:55 Date Received: 11/10/11 18:20

Client Sample ID: OC-PZ-18R

**Specific Conductance** 

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	200		20	20	mg/L			11/24/11 11:57	10
Chloride	150		10		mg/L			11/24/11 11:57	10
Ammonia	62		1.0		mg/L		11/23/11 09:19	11/23/11 15:00	10
Specific Conductance	1200		1.0		umhos/cm			11/19/11 08:23	1

# **Definitions/Glossary**

Client: Olin Corporation

Project/Site: Olin Chemical Semiannual

Toxicity Equivalent Quotient (Dioxin)

TestAmerica Job ID: 360-37526-1

#### **Qualifiers**

#### Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

#### **General Chemistry**

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is 4 times greater than the matrix spike concentration; therefore, control limits are not
	applicable.
F	MS or MSD exceeds the control limits

# Glossary

TEQ

Abbreviation	These commonly used abbreviations may or may not be present in this report.
<b></b>	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CNF	Contains no Free Liquid
DL, RA, RE, IN	Indicates a Dilution, Reanalysis, Re-extraction, or additional Initial metals/anion analysis of the sample
EDL	Estimated Detection Limit
EPA	United States Environmental Protection Agency
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
RL	Reporting Limit
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)

# **QC Association Summary**

Client: Olin Corporation

Project/Site: Olin Chemical Semiannual

TestAmerica Job ID: 360-37526-1

#### **Metals**

#### Analysis Batch: 83421

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37526-1	OC-GW-78S	Dissolved	Water	6010B	
360-37526-2	OC-GW-35S	Dissolved	Water	6010B	
360-37526-3	OC-GW-201S	Dissolved	Water	6010B	
360-37526-3 MS	OC-GW-201S	Dissolved	Water	6010B	
360-37526-3 MSD	OC-GW-201S	Dissolved	Water	6010B	
360-37526-4	OC-GW-201S-DUP	Dissolved	Water	6010B	
360-37526-5	OC-GW-79S	Dissolved	Water	6010B	
360-37526-6	OC-PZ-16RR	Dissolved	Water	6010B	
360-37526-7	OC-PZ-17RR	Dissolved	Water	6010B	
360-37526-8	OC-PZ-18R	Dissolved	Water	6010B	
LCS 360-83421/1	Lab Control Sample	Total/NA	Water	6010B	
LCSD 360-83421/5	Lab Control Sample Dup	Total/NA	Water	6010B	
MB 360-83421/2	Method Blank	Total/NA	Water	6010B	

#### **General Chemistry**

#### Analysis Batch: 83283

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37526-1	OC-GW-78S	Total/NA	Water	SM 2510B	
360-37526-2	OC-GW-35S	Total/NA	Water	SM 2510B	
360-37526-4	OC-GW-201S-DUP	Total/NA	Water	SM 2510B	
360-37526-5	OC-GW-79S	Total/NA	Water	SM 2510B	
360-37526-6	OC-PZ-16RR	Total/NA	Water	SM 2510B	
360-37526-7	OC-PZ-17RR	Total/NA	Water	SM 2510B	
LCS 360-83283/1	Lab Control Sample	Total/NA	Water	SM 2510B	
MB 360-83283/3	Method Blank	Total/NA	Water	SM 2510B	

#### Analysis Batch: 83626

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37526-3	OC-GW-201S	Total/NA	Water	SM 2510B	
360-37526-3 DU	OC-GW-201S	Total/NA	Water	SM 2510B	
360-37526-8	OC-PZ-18R	Total/NA	Water	SM 2510B	
LCS 360-83626/1	Lab Control Sample	Total/NA	Water	SM 2510B	
MB 360-83626/3	Method Blank	Total/NA	Water	SM 2510B	

#### Prep Batch: 83754

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37526-1	OC-GW-78S	Total/NA	Water	Distill/Ammonia	
360-37526-2	OC-GW-35S	Total/NA	Water	Distill/Ammonia	
360-37526-3	OC-GW-201S	Total/NA	Water	Distill/Ammonia	
360-37526-3 MS	OC-GW-201S	Total/NA	Water	Distill/Ammonia	
360-37526-3 MSD	OC-GW-201S	Total/NA	Water	Distill/Ammonia	
360-37526-4	OC-GW-201S-DUP	Total/NA	Water	Distill/Ammonia	
360-37526-5	OC-GW-79S	Total/NA	Water	Distill/Ammonia	
360-37526-6	OC-PZ-16RR	Total/NA	Water	Distill/Ammonia	
360-37526-7	OC-PZ-17RR	Total/NA	Water	Distill/Ammonia	
LCS 360-83754/2-A	Lab Control Sample	Total/NA	Water	Distill/Ammonia	
MB 360-83754/1-A	Method Blank	Total/NA	Water	Distill/Ammonia	

#### Analysis Batch: 83764

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37526-7	OC-PZ-17RR	Total/NA	Water	300.0	

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TestAmerica Job ID: 360-37526-1

Client: Olin Corporation

Project/Site: Olin Chemical Semiannual

#### **General Chemistry (Continued)**

#### **Analysis Batch: 83764 (Continued)**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 360-83764/6	Lab Control Sample	Total/NA	Water	300.0	
MB 360-83764/5	Method Blank	Total/NA	Water	300.0	

#### Analysis Batch: 83765

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37526-3	OC-GW-201S	Total/NA	Water	300.0	
360-37526-3 MS	OC-GW-201S	Total/NA	Water	300.0	
360-37526-3 MSD	OC-GW-201S	Total/NA	Water	300.0	
LCS 360-83765/6	Lab Control Sample	Total/NA	Water	300.0	
MB 360-83765/5	Method Blank	Total/NA	Water	300.0	

#### Analysis Batch: 83766

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37526-1	OC-GW-78S	Total/NA	Water	300.0	
360-37526-2	OC-GW-35S	Total/NA	Water	300.0	
LCS 360-83766/6	Lab Control Sample	Total/NA	Water	300.0	
MB 360-83766/5	Method Blank	Total/NA	Water	300.0	

#### Prep Batch: 83810

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37526-8	OC-PZ-18R	Total/NA	Water	Distill/Ammonia	
360-37526-8 MS	OC-PZ-18R	Total/NA	Water	Distill/Ammonia	
360-37526-8 MSD	OC-PZ-18R	Total/NA	Water	Distill/Ammonia	
LCS 360-83810/2-A	Lab Control Sample	Total/NA	Water	Distill/Ammonia	
MB 360-83810/1-A	Method Blank	Total/NA	Water	Distill/Ammonia	

#### Analysis Batch: 83912

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37526-1	OC-GW-78S	Total/NA	Water	L107-06-1B	83754
360-37526-2	OC-GW-35S	Total/NA	Water	L107-06-1B	83754
360-37526-3	OC-GW-201S	Total/NA	Water	L107-06-1B	83754
360-37526-3 MS	OC-GW-201S	Total/NA	Water	L107-06-1B	83754
360-37526-3 MSD	OC-GW-201S	Total/NA	Water	L107-06-1B	83754
360-37526-4	OC-GW-201S-DUP	Total/NA	Water	L107-06-1B	83754
360-37526-5	OC-GW-79S	Total/NA	Water	L107-06-1B	83754
360-37526-6	OC-PZ-16RR	Total/NA	Water	L107-06-1B	83754
360-37526-7	OC-PZ-17RR	Total/NA	Water	L107-06-1B	83754
LCS 360-83754/2-A	Lab Control Sample	Total/NA	Water	L107-06-1B	83754
MB 360-83754/1-A	Method Blank	Total/NA	Water	L107-06-1B	83754

#### Analysis Batch: 83913

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37526-8	OC-PZ-18R	Total/NA	Water	L107-06-1B	83810
360-37526-8 MS	OC-PZ-18R	Total/NA	Water	L107-06-1B	83810
360-37526-8 MSD	OC-PZ-18R	Total/NA	Water	L107-06-1B	83810
LCS 360-83810/2-A	Lab Control Sample	Total/NA	Water	L107-06-1B	83810
MB 360-83810/1-A	Method Blank	Total/NA	Water	L107-06-1B	83810

#### Analysis Batch: 83987

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37526-5	OC-GW-79S	Total/NA	Water	300.0	
360-37526-5	OC-GW-79S	Total/NA	Water	300.0	

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# **QC Association Summary**

Client: Olin Corporation

Project/Site: Olin Chemical Semiannual

TestAmerica Job ID: 360-37526-1

# **General Chemistry (Continued)**

#### **Analysis Batch: 83987 (Continued)**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37526-6	OC-PZ-16RR	Total/NA	Water	300.0	
360-37526-6	OC-PZ-16RR	Total/NA	Water	300.0	
360-37526-8	OC-PZ-18R	Total/NA	Water	300.0	
LCS 360-83987/6	Lab Control Sample	Total/NA	Water	300.0	
MB 360-83987/5	Method Blank	Total/NA	Water	300.0	

#### **Analysis Batch: 84080**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37526-1	OC-GW-78S	Total/NA	Water	300.0	
360-37526-2	OC-GW-35S	Total/NA	Water	300.0	
360-37526-3	OC-GW-201S	Total/NA	Water	300.0	
360-37526-3 MS	OC-GW-201S	Total/NA	Water	300.0	
360-37526-3 MSD	OC-GW-201S	Total/NA	Water	300.0	
360-37526-4	OC-GW-201S-DUP	Total/NA	Water	300.0	
360-37526-4	OC-GW-201S-DUP	Total/NA	Water	300.0	
LCS 360-84080/4	Lab Control Sample	Total/NA	Water	300.0	
MB 360-84080/3	Method Blank	Total/NA	Water	300.0	

#### Analysis Batch: 84209

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37526-7	OC-PZ-17RR	Total/NA	Water	300.0	
LCS 360-84209/6	Lab Control Sample	Total/NA	Water	300.0	
MB 360-84209/5	Method Blank	Total/NA	Water	300.0	

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TestAmerica Job ID: 360-37526-1

Client: Olin Corporation

Project/Site: Olin Chemical Semiannual

Method: 6010B - Dissolved Metals

Lab Sample ID: MB 360-83421/2

**Matrix: Water** 

Analyte

Aluminum

Chromium

Analysis Batch: 83421

Client Sample ID: Method Blank Prep Type: Total/NA

мв мв Result Qualifier RL MDL Unit Dil Fac D Prepared Analyzed 100 13 ug/L ND 11/15/11 16:59 ND 11/15/11 16:59 5.0 0.65 ug/L

Lab Sample ID: LCS 360-83421/1 **Client Sample ID: Lab Control Sample** 

**Matrix: Water** Prep Type: Total/NA

**Analysis Batch: 83421** 

LCS LCS Spike %Rec. Result Qualifier Analyte Added Unit %Rec Limits Aluminum 5000 5190 ug/L 104 80 - 120 Chromium 1000 999 ug/L 100 80 - 120

Lab Sample ID: LCSD 360-83421/5 Client Sample ID: Lab Control Sample Dup

**Matrix: Water** Prep Type: Total/NA

**Analysis Batch: 83421** 

Spike LCSD LCSD %Rec. RPD Analyte Added Result Qualifier Unit D %Rec Limits **RPD** Limit Aluminum 5000 5240 105 80 - 120 ug/L 20 Chromium 1000 1030 80 - 120 20 ug/L 103 3

Lab Sample ID: 360-37526-3 MS Client Sample ID: OC-GW-201S **Matrix: Water Prep Type: Dissolved** 

Analysis Batch: 83421

Sample Sample Spike MS MS %Rec. Result Qualifier Added Result Qualifier Limits Analyte Unit D %Rec 5000 75 - 125 Aluminum ND 4980 ug/L 100 1000 970 75 - 125 Chromium 16 ug/L 95

Lab Sample ID: 360-37526-3 MSD Client Sample ID: OC-GW-201S **Prep Type: Dissolved** 

**Matrix: Water** 

**Analysis Batch: 83421** 

-	Sample	Sample	Spike	MSD	MSD				%Rec.		RPD
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Aluminum	ND		5000	5070		ug/L		101	75 - 125	2	20
Chromium	16		1000	997		ug/L		98	75 - 125	3	20

Method: 300.0 - Chloride & Sulfate

Lab Sample ID: MB 360-83764/5 Client Sample ID: Method Blank Prep Type: Total/NA

**Matrix: Water** 

Analysis Batch: 83764

	MB	MB							
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	ND		2.0	2.0	mg/L			11/19/11 03:57	1
Chloride	ND		1.0	1.0	mg/L			11/19/11 03:57	1

Lab Sample ID: LCS 360-83764/6

**Matrix: Water** 

Analysis Batch: 83764

Analysis Baton. 60704							
	Spike	LCS	LCS			%Rec.	
Analyte	Added	Result	Qualifier U	nit D	%Rec	Limits	
Sulfate	80.0	83.2	m	ng/L	104	85 - 115	

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Prep Type: Total/NA

**Client Sample ID: Lab Control Sample** 

TestAmerica Job ID: 360-37526-1

Client: Olin Corporation

Project/Site: Olin Chemical Semiannual

Method: 300.0 - Chloride & Sulfate (Continued)

Lab Sample ID: LCS 360-83764/6 **Client Sample ID: Lab Control Sample Matrix: Water** Prep Type: Total/NA

Analysis Batch: 83764

Spike LCS LCS %Rec. Analyte Added Result Qualifier Unit D Limits %Rec Chloride 40.0 42.1 mg/L 105 85 - 115

Lab Sample ID: MB 360-83765/5 Client Sample ID: Method Blank **Matrix: Water** Prep Type: Total/NA

Analysis Batch: 83765

	IVID IVID							
Analyte	Result Qualit	fier RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	ND	2.0	2.0	mg/L			11/19/11 10:56	1
Chloride	ND	1.0	1.0	mg/L			11/19/11 10:56	1

Lab Sample ID: LCS 360-83765/6 **Client Sample ID: Lab Control Sample Matrix: Water** Prep Type: Total/NA

**Analysis Batch: 83765** 

	Spike	LCS	LUS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Sulfate	 80.0	83.1		mg/L		104	85 - 115	
Chloride	40.0	42.0		mg/L		105	85 - 115	

Lab Sample ID: 360-37526-3 MS Client Sample ID: OC-GW-201S Prep Type: Total/NA

**Matrix: Water** 

Analysis Batch: 83765

-	Sample	Sample	Spike	MS	MS				%Rec.	
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Chloride	77		100	190		ma/l		113	75 125	

Lab Sample ID: 360-37526-3 MSD Client Sample ID: OC-GW-201S Prep Type: Total/NA

**Matrix: Water** 

Analysis Batch: 83765

-	Sample	Sample	Spike	MSD	MSD				%Rec.		RPD	
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit	
Chloride	77		100	190		mg/L		113	75 - 125	0	20	

Lab Sample ID: MB 360-83766/5 Client Sample ID: Method Blank Prep Type: Total/NA

**Matrix: Water** 

Analysis Batch: 83766

Analyte	Result Qualifier	RL	RL Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND —	1.0	1.0 mg/L			11/19/11 17:55	1

MR MR

Lab Sample ID: LCS 360-83766/6 Client Sample ID: Lab Control Sample Prep Type: Total/NA

**Matrix: Water** 

Analysis Batch: 83766

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Chloride	40.0	41.9		mg/L	_	105	85 - 115	

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TestAmerica Job ID: 360-37526-1

Client: Olin Corporation

Project/Site: Olin Chemical Semiannual

Lab Sample ID: MB 360-83987/5

Method: 300.0 - Chloride & Sulfate (Continued)

Client Sample ID: Method Blank Prep Type: Total/NA

**Matrix: Water** 

Analysis Batch: 83987

	IVID IVID						
Analyte	Result Qualifier	RL	RL Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	ND —	2.0	2.0 mg/L			11/24/11 09:00	1
Chloride	ND	1.0	1.0 mg/L			11/24/11 09:00	1

Lab Sample ID: LCS 360-83987/6 Client Sample ID: Lab Control Sample Prep Type: Total/NA

**Matrix: Water** 

Analysis Batch: 83987

	Spike	LCS	LCS				%Rec.		
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits		
Sulfate	 80.0	86.5		mg/L		108	85 - 115		_
Chloride	40.0	43.9		mg/L		110	85 - 115		

Lab Sample ID: MB 360-84080/3 Client Sample ID: Method Blank Prep Type: Total/NA

**Matrix: Water** 

Analysis Batch: 84080

	IVID IVID							
Analyte	Result Qua	alifier RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	ND	2.0	2.0	mg/L			11/28/11 20:17	1
Chloride	ND	1.0	1.0	mg/L			11/28/11 20:17	1

Lab Sample ID: LCS 360-84080/4 **Client Sample ID: Lab Control Sample** Prep Type: Total/NA

**Matrix: Water** 

Analysis Batch: 84080

	Spike	LCS	LCS				%Rec.		
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits		
Sulfate	 80.0	77.4		mg/L		97	85 - 115		_
Chloride	40.0	39.8		mg/L		99	85 <sub>-</sub> 115		

Lab Sample ID: 360-37526-3 MS Client Sample ID: OC-GW-201S Prep Type: Total/NA

**Matrix: Water** 

Analysis Batch: 84080

	Sample	Sample	Spike	MS	MS				%Rec.	
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Sulfate	1400		400	1770		mg/L	_	92	75 _ 125	

Lab Sample ID: 360-37526-3 MSD Client Sample ID: OC-GW-201S Prep Type: Total/NA

**Matrix: Water** 

**Analysis Batch: 84080** 

	Sample	Sample	Spike	MSD	MSD				%Rec.		RPD
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Sulfate	1400		400	1590	F	ma/l		47	75 - 125	11	20

Lab Sample ID: MB 360-84209/5 Client Sample ID: Method Blank Prep Type: Total/NA

Matrix: Water

**Analysis Batch: 84209** 

	MB	MB							
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	ND		2.0	2.0	mg/L			12/01/11 16:00	1
Chloride	ND		1.0	1.0	mg/L			12/01/11 16:00	1

TestAmerica Job ID: 360-37526-1

Prep Type: Total/NA

Prep Batch: 83754

Prep Batch: 83754

Prep Type: Total/NA

Prep Type: Total/NA

Client Sample ID: OC-GW-201S

Client Sample ID: Lab Control Sample

Client: Olin Corporation

Project/Site: Olin Chemical Semiannual

Method: 300.0 - Chloride & Sulfate (Continued)

Lab Sample ID: LCS 360-84209/6 Client Sample ID: Lab Control Sample Prep Type: Total/NA

**Matrix: Water** 

**Analysis Batch: 84209** 

, , , , , , , , , , , , , , , , , , , ,	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Sulfate	 80.0	78.5		mg/L		98	85 - 115	 
Chloride	40.0	41.4		mg/L		103	85 - 115	

Method: L107-06-1B - Nitrogen Ammonia

Lab Sample ID: MB 360-83754/1-A Client Sample ID: Method Blank

**Matrix: Water** 

**Analysis Batch: 83912** 

MB MB

Analyte Result Qualifier RL **RL** Unit Prepared Analyzed Dil Fac ND 0.10 11/22/11 11:45 11/23/11 14:05 Ammonia 0.10 mg/L

Lab Sample ID: LCS 360-83754/2-A Client Sample ID: Lab Control Sample Prep Type: Total/NA

**Matrix: Water** 

Analysis Batch: 83912

Spike LCS LCS %Rec. Analyte Added Result Qualifier Unit D Limits %Rec

10.0 Ammonia 9.28 mg/L 93 90 - 110

Lab Sample ID: 360-37526-3 MS Client Sample ID: OC-GW-201S

**Matrix: Water** 

**Analysis Batch: 83912** 

Prep Batch: 83754 Sample Sample Spike MS MS %Rec. Analyte Added Result Qualifier Result Qualifier Unit D %Rec Limits Ammonia 180 10.0 192 4 mg/L 134 90 - 110

Lab Sample ID: 360-37526-3 MSD

**Matrix: Water** 

Analysis Batch: 83912

Prep Batch: 83754 Spike MSD MSD Sample Sample %Rec. **RPD** Added Analyte Result Qualifier Result Qualifier Unit D %Rec Limits RPD Limit 180 10.0 188 4 mg/L 90 - 110 Ammonia

Lab Sample ID: MB 360-83810/1-A Client Sample ID: Method Blank

**Matrix: Water** 

**Analysis Batch: 83913** 

Prep Type: Total/NA Prep Batch: 83810 мв мв

Analyte Result Qualifier RL **RL** Unit Prepared Analyzed Dil Fac Ammonia ND 0.10 0.10 mg/L 11/23/11 09:19 11/23/11 14:25

Lab Sample ID: LCS 360-83810/2-A

**Matrix: Water** 

Analysis Batch, 92042								-t-b: 02040
Analysis Batch: 83913							Prep B	atch: 83810
	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Ammonia	10.0	10.4		mg/L		104	90 - 110	

Prep Type: Total/NA

Client: Olin Corporation

Project/Site: Olin Chemical Semiannual

TestAmerica Job ID: 360-37526-1

Method: L107-06-1B - Nitrogen Ammonia (Continued)

Lab Sample ID: 360-37526-8 MS

**Matrix: Water** 

**Analysis Batch: 83913** 

Client Sample ID: OC-PZ-18R Prep Type: Total/NA

Prep Batch: 83810

Sample Sample Spike MS MS Result Qualifier Added Result Qualifier Analyte Unit %Rec Limits D 10.0 71.2 4 90 - 110 Ammonia 62 mg/L 93

Lab Sample ID: 360-37526-8 MSD

**Matrix: Water** 

**Analysis Batch: 83913** 

Client Sample ID: OC-PZ-18R

Prep Type: Total/NA

Prep Batch: 83810 %Rec. RPD Limit Limits RPD

MSD MSD Sample Sample Spike Analyte Result Qualifier Added Result Qualifier Unit %Rec Ammonia 62 10.0 74.0 4 mg/L 121 90 - 110 20

Method: SM 2510B - Conductivity, Specific Conductance

Lab Sample ID: MB 360-83283/3

**Matrix: Water** 

**Analysis Batch: 83283** 

Client Sample ID: Method Blank

**Client Sample ID: Lab Control Sample** 

Prep Type: Total/NA

Prep Type: Total/NA

MR MR

Analyte Result Qualifier RL Unit Prepared Analyzed Dil Fac Specific Conductance 1.0 ND 1.0 umhos/cm 11/12/11 09:43

Lab Sample ID: LCS 360-83283/1

**Matrix: Water** 

**Analysis Batch: 83283** 

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Specific Conductance		1410		umhos/cm		100	85 - 115	-

Lab Sample ID: MB 360-83626/3

**Matrix: Water** 

Analysis Batch: 83626

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Type: Total/NA

MB MB

Analyte	Result Qualifier	RL	RL Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	ND	1.0	1.0 umhos/cm			11/19/11 08:19	1

Lab Sample ID: LCS 360-83626/1

**Matrix: Water** 

Analysis Batch, 92626

Allalysis Batch. 03020						
	Spike	LCS LCS			%Rec.	
Analyte	Added	Result Qual	lifier Unit	D %Rec	Limits	
Specific Conductance	1410	1400	umhos/cm	99	85 - 115	 _

Lab Sample ID: 360-37526-3 DU

Analysis Batch: 83626

**Matrix: Water** 

Client Sample ID: OC-GW-201S

**Client Sample ID: Lab Control Sample** 

Prep Type: Total/NA

Sample Sample DU DU RPD Analyte Result Qualifier Result Qualifier Unit D **RPD** Limit Specific Conductance 3100 3120 umhos/cm

entries completed by day [ new page each day]

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											Serial L	Dilution		
		Date	Method	LIMs Sample ID	Rpt'd Dil.	Sample Aliquot 1		Final Volume 1	Units	Sample Aliquot 2	Units	Final Volume 2	Units	Comments
1 C7 50x 200 JLL 1 2757685 10x 1 mL 10		11-18-11	3000	37684 C1	(OX	1		W	jul					
1 C2 C0K 1 mh 1 3752685 10X 1 mh 1 37552C9 10X 1 mh 10 37552C9 10X 1 mh 10 100 100 100 100 100 100 100 100 100				( C1	20%	200	μL							
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TestAmerica Westfield

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11-23-11

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ار <u>- ۱۱ کیس</u>	11-23-11	N143	37526A3A	(0メ		m	G	12					
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**Analytical Dilution Preparation Log** TestAmerica Westfield

Comments	ן ≥	nalytic	al Dilution P	Analytical Dilution Preparation Log								,	Date:	11-28-11
Mathod   Line Sample ID   Rept On   Allanda   Units   Volume 2   Units   Volume 2   Units   Volume 3   Units   Volume 4   Units   Volume 4   Units   Volume 5   Units   Volume 5   Units   Volume 6   Units   Volume 7   Units   Volume 7   Units   Volume 7   Units   Volume 8   Uni	 >	naivst									Serial D	ilution		
11-73-W 1/43 37532676A 55X 200 ML (0 ML)  \$ \$ 37552676A 55X \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	) <sub>=</sub> ;	nitials	Date		LIMs Sample ID	Rpt'd Dil.	Sample Aliquot 1	<u>L</u>	Units	Sample Aliquot 2		Final Volume 2	Units	Comments
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entries completed by day [ new page each day]

TestAmerica Job ID: 360-37526-1

Lab Sample ID: 360-37526-1

Client: Olin Corporation

Project/Site: Olin Chemical Semiannual

Client Sample ID: OC-GW-78S

Date Collected: 11/09/11 11:40 Matrix: Water

Date Received: 11/10/11 18:20

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B		1	83421	11/15/11 17:47	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83283	11/12/11 10:09	AMS	TAL WFD
Total/NA	Analysis	300.0		1	83766	11/19/11 20:20	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			83754	11/22/11 11:45	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		10	83912	11/23/11 14:52	RWE	TAL WFD
Total/NA	Analysis	300.0		10	84080	11/29/11 00:03	RWE	TAL WFD

Client Sample ID: OC-GW-35S Lab Sample ID: 360-37526-2

Date Collected: 11/09/11 14:05 Matrix: Water

Date Received: 11/10/11 18:20

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B			83421	11/15/11 17:50	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83283	11/12/11 10:10	AMS	TAL WFD
Total/NA	Analysis	300.0		1	83766	11/19/11 20:36	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			83754	11/22/11 11:45	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		10	83912	11/23/11 14:53	RWE	TAL WFD
Total/NA	Analysis	300.0		10	84080	11/29/11 00:19	RWE	TAL WFD

Client Sample ID: OC-GW-201S Lab Sample ID: 360-37526-3

Date Collected: 11/09/11 09:20 Date Received: 11/10/11 18:20

_	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B			83421	11/15/11 17:29	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83626	11/19/11 08:20	AMS	TAL WFD
Total/NA	Analysis	300.0		10	83765	11/19/11 11:44	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			83754	11/22/11 11:45	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		10	83912	11/23/11 14:48	RWE	TAL WFD
Total/NA	Analysis	300.0		20	84080	11/28/11 20:49	RWE	TAL WFD

Client Sample ID: OC-GW-201S-DUP Lab Sample ID: 360-37526-4

Date Collected: 11/09/11 09:20 Date Received: 11/10/11 18:20

_	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B	-	1	83421	11/15/11 17:53	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83283	11/12/11 10:12	AMS	TAL WFD
Total/NA	Prep	Distill/Ammonia			83754	11/22/11 11:45	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		10	83912	11/23/11 14:54	RWE	TAL WFD
Total/NA	Analysis	300.0		10	84080	11/28/11 22:58	RWE	TAL WFD
Total/NA	Analysis	300.0		20	84080	11/28/11 23:14	RWE	TAL WFD

**Matrix: Water** 

Matrix: Water

Client: Olin Corporation

Project/Site: Olin Chemical Semiannual

Client Sample ID: OC-GW-79S

Date Collected: 11/09/11 10:20 Date Received: 11/10/11 18:20

Lab Sample ID: 360-37526-5

Matrix: Water

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B			83421	11/15/11 17:56	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83283	11/12/11 10:13	AMS	TAL WFD
Total/NA	Prep	Distill/Ammonia			83754	11/22/11 11:45	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		10	83912	11/23/11 14:55	RWE	TAL WFD
Total/NA	Analysis	300.0		10	83987	11/24/11 10:36	RWE	TAL WFD
Total/NA	Analysis	300.0		20	83987	11/24/11 10:52	RWE	TAL WFD

Client Sample ID: OC-PZ-16RR

Date Collected: 11/09/11 10:30

Date Received: 11/10/11 18:20

Lab Sample ID: 360-37526-6

Matrix: Water

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B			83421	11/15/11 17:59	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83283	11/12/11 10:15	AMS	TAL WFD
Total/NA	Prep	Distill/Ammonia			83754	11/22/11 11:45	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		50	83912	11/23/11 15:11	RWE	TAL WFD
Total/NA	Analysis	300.0		10	83987	11/24/11 11:08	RWE	TAL WFD
Total/NA	Analysis	300.0		20	83987	11/24/11 11:25	RWE	TAL WFD

Client Sample ID: OC-PZ-17RR

Date Collected: 11/09/11 12:00

Date Received: 11/10/11 18:20

Lab Sample ID: 360-37526-7

Matrix: Water

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B			83421	11/15/11 18:02	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83283	11/12/11 10:16	AMS	TAL WFD
Total/NA	Analysis	300.0		1	83764	11/19/11 07:42	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			83754	11/22/11 11:45	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		10	83912	11/23/11 14:57	RWE	TAL WFD
Total/NA	Analysis	300.0		10	84209	12/01/11 17:52	AMS	TAL WFD

Client Sample ID: OC-PZ-18R

Date Collected: 11/09/11 12:55

Date Received: 11/10/11 18:20

Lab Sample ID: 360-37526-8 Matrix: Water

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B		1	83421	11/15/11 18:05	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83626	11/19/11 08:23	AMS	TAL WFD
Total/NA	Prep	Distill/Ammonia			83810	11/23/11 09:19	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		10	83913	11/23/11 15:00	RWE	TAL WFD
Total/NA	Analysis	300.0		10	83987	11/24/11 11:57	RWE	TAL WFD

## **Lab Chronicle**

Client: Olin Corporation

Project/Site: Olin Chemical Semiannual

TestAmerica Job ID: 360-37526-1

#### Laboratory References:

TAL WFD = TestAmerica Westfield, Westfield Executive Park, 53 Southampton Road, Westfield, MA 01085, TEL (413)572-4000

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## **Certification Summary**

Client: Olin Corporation

Project/Site: Olin Chemical Semiannual

TestAmerica Job ID: 360-37526-1

Laboratory	Authority	Program	EPA Region	Certification ID
TestAmerica Westfield	Connecticut	State Program	1	PH-0494
TestAmerica Westfield	Maine	State Program	1	MA00014
TestAmerica Westfield	Massachusetts	State Program	1	M-MA014
TestAmerica Westfield	New Hampshire	NELAC	1	2539
TestAmerica Westfield	New York	NELAC	2	10843
TestAmerica Westfield	North Carolina	North Carolina DENR	4	647
TestAmerica Westfield	Rhode Island	State Program	1	LAO00057

Accreditation may not be offered or required for all methods and analytes reported in this package. Please contact your project manager for the laboratory's current list of certified methods and analytes.

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		State where P	rimary Accredit	ation is Carried
		New		
Method Name	Description	Hampshire (NELAC)	Mass	Conn
821-R-02-012	Toxicity, Acute (48-Hour)(list upon request)	NP	IVIESS	COIIII
SM 4500 CI F	Chlorine, Residual		NP	
SM 9215E	Heterotrophic Plate Count (SimPlate)		Р	
SM 9222D	Coliforms, Fecal (Membrane Filter)		P/NP	
SM 9223	Coliforms, Total, and E.Coli (Colilert-P/A)		Р	
SM 9224	Coliforms, Total, and E.Coli (Enumeration)		Р	
1103.1	E.coli		ambient/	
Enterolert	Enterococcus		source	
200.8 Rev 5.4	Metals (ICP/MS) (list upon request)	NP/P	NP/P	
200.7 Rev 4.4	Metals (ICP)(list upon request)	NP/P	NP/P	
6010B/C	Metals (ICP)(list upon request)	NP/SW		
245.1	Mercury (CVAA)	NP/P	NP	
7470A	Mercury (CVAA)	NP		
7471A	Mercury (CVAA)	SW		
SM 2340B	Total Hardness (as CaCO3) by calculation	NP/P	NP	
3005A	Preparation, Total Recoverable or Dissolved Metals	NP/P		
3010A	Preparation, Total Metals	NP/P NP/P/SW		ļ
3020A	Preparation, Total Metals	NP/P/SW SW		
3050B	Preparation, Metals	SW	P	
504.1 608	EDB, DBCP and 1,2,3-TCP (GC)	NP	NP	
625	Organochlorine Pest/PCBs (list upon request)	NP	NP	
3546	Semivolatile Org Comp (GC/MS)(list upon request)  Microwave Extraction	SW	INF	
3510C	Liquid-Liquid Extraction (Separatory Funnel)	NP		
3550B	Ultrasonic Extraction  Ultrasonic Extraction	SW		
8081AB	Organochlorine Pesticides (GC)(list upon request)	NP/SW		
8082/A	PCBs by Gas Chromatography(list upon request)	NP/SW		l 
8270C/D	Semivolatile Comp.(GC/MS)(list upon request)	NP/SW		
CT ETPH	Conn - Ext. Total petroleum Hydrocarbons (GC)	NP/SW		NP/SW
MA-EPH	Mass - Extractable Petroleum Hydrocarbons (GC)	NP/SW		
524.2	Volatile Org Comp (GC/MS)(list upon request)	Р	Р	
524.2	Trihalomethane compounds	Р	Р	
624	Volatile Org Comp (GC/MS)(list upon request)	NP	NP	
5035	Closed System Purge and Trap	SW		
5030B	Purge and Trap	NP		
8260B/C	Volatile Org Comp. (GC/MS)(list upon request)	NP/SW		
MAVPH	Mass - Volatile Petroleum Hydrocarbons (GC)			
180.1	Turbidity, Nephelometric	Р	Р	
300	Anions, Ion Chromatography	NP/P	NP/P	
410.4	COD	NP	NP	
1010	Ignitability, Pensky-Martens Closed-Cup Method	SW		
10-107-06-2	Nitrogen, Total Kjeldahl	NP	NP	
7196A	Chromium, Hexavalent	NP/SW NP/SW		
9012A	Cyanide, Total and/or Amenable	NP/SW		
9030B	Sulfide, Distillation (Acid Soluble and Insoluble)	SW		
9045C L107041C	pH Nitrogen Nitrate	NP	P	
L107041C L107-06-1B	Nitrogen, Nitrate Nitrogen Ammonia	NP	NP	<del> </del>
L204001A CN	Cyanide, Total	P	NP/P	
L210-001A	Phenolics, Total Recoverable	NP	NP	1
SM 2320B	Alkalinity	NP/P	NP/P	
SM 2510B	Conductivity, Specific Conductance	NP/P	NP/P	
SM 2540C	Solids, Total Dissolved (TDS)	NP/P	NP/P	
SM 2540D	Solids, Total Suspended (TSS)	NP	NP	l
SM 3500 CR D	Chromium, Hexavalent	NP		
SM 4500 H+ B	pH	NP/P	NP/P	
SM 4500 NO2 B	Nitrogen, Nitrite	NP	Р	
SM 4500 P E	Phosphorus, Orthophosphate	NP/P	NP	
SM 4500 P E	Phosphorus, Total	NP	NP	
SM 4500 S2 D	Sulfide, Total	NP		
SM 5210B	BOD, 5-Day	NP	NP	
SM 5310B	Organic Carbon, Total (TOC)	NP/P	NP	

Not all organic compounds are accreditied under NELAC

For methods with multiple compounds all compounds may not meet NELAC criteria, listing should be obtained from the laboratory The lab carries additional accreditations with several states. This is the laboratories typical listing but is subject to change based on the laboratories current certification standing.

## **Login Sample Receipt Checklist**

Client: Olin Corporation Job Number: 360-37526-1

Login Number: 37526 List Source: TestAmerica Westfield

List Number: 1

Creator: Ard, Vanessa L

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Question	Answer Comment
Radioactivity either was not measured or, if measured, is at or below background	N/A
The cooler's custody seal, if present, is intact.	N/A
The cooler or samples do not appear to have been compromised or tampered with.	True
Samples were received on ice.	True
Cooler Temperature is acceptable.	True
Cooler Temperature is recorded.	True
COC is present.	True
COC is filled out in ink and legible.	True
COC is filled out with all pertinent information.	True
Is the Field Sampler's name present on COC?	True
There are no discrepancies between the sample IDs on the containers and the COC.	True
Samples are received within Holding Time.	True
Sample containers have legible labels.	True
Containers are not broken or leaking.	True
Sample collection date/times are provided.	True
Appropriate sample containers are used.	True
Sample bottles are completely filled.	True
Sample Preservation Verified.	True
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A
Multiphasic samples are not present.	True
Samples do not require splitting or compositing.	True
Residual Chlorine Checked.	N/A

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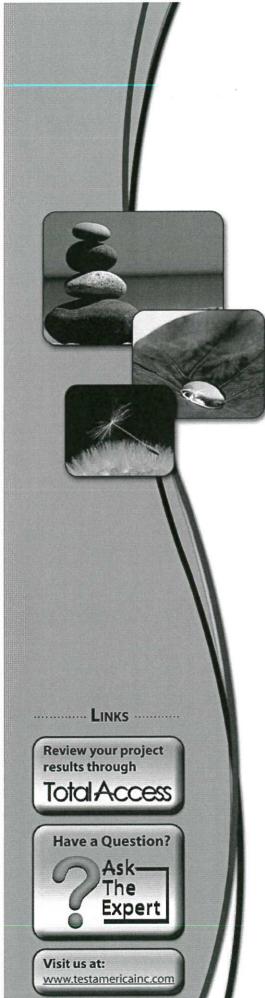
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TestAmerica Westfield							
Westfield Executive Park 53 Southampton Road				5	ain of C	Chain of Custody Record	
Westfield, MA 01085				5		5	
Phone (413) 572-4000 Fax (413) 572-3707							
	Sampler	į	- 0	7. i	Lab PM:	 (A)	Carrier Tracking No(s):

**TestAmerica** 

Westfield, MA 01085 Phone (413) 572-4000 Fax (413) 572-3707						<b>)</b>				<b>201</b> —	'HE LEADER IN EN	THE LEADER IN ENVIRONMENTAL TESTING
Client Information	Sampler Chris	Pac	7		Bark	Massen		Carrier Tracking No(s):	:(s)oN &L	8	COC No:	7505
Client Contact Tomes Cashwell	Phone:			E-Maíl:	***					c.	Page:	-
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Possible Hazard Identification  Non-Hazard	Poison B Unk	Unknown Ra	Radiological		Sample Dis Retu	le Disposal ( A f Retum To Client	fee may be a $\int_{L}$	assessed i Disposal B	d if samples a By Lab	are retained l	Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)  Return To Client Disposal By Lab Mod	<b>1 month)</b> Months
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TAL-8245-360 0310



## **FILE COPY**

# <u>TestAmerica</u>

THE LEADER IN ENVIRONMENTAL TESTING

## **ANALYTICAL REPORT**

TestAmerica Laboratories, Inc. TestAmerica Westfield Westfield Executive Park 53 Southampton Road Westfield, MA 01085 Tel: (413)572-4000

CHECKED FOR COMPLETENESS OF PARAMETERS ORDERED BY:

TestAmerica Job ID: 360-37552-1

Client Project/Site: Olin Chemical Groundwater

For:

Olin Corporation PO BOX 248 Charleston, Tennessee 37310-0248

Attn: Mr. James Cashwell

Cheynold&

Authorized for release by: 12/2/2011 2:12:56 PM Chris Reynolds

QA Manager chris.reynolds@testamericainc.com

Designee for

Becky Mason Project Manager II

becky.mason@testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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#### **Case Narrative**

Client: Olin Corporation

Project/Site: Olin Chemical Groundwater

TestAmerica Job ID: 360-37552-1

Job ID: 360-37552-1

#### Laboratory: TestAmerica Westfield

#### Narrative

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

#### **RECEIPT**

The samples were received on 11/10/2011; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 7.1 C.

Note: All samples that require thermal preservation are considered acceptable if the arrival temperature is within the method's specified temperature range or for general analysis, ranging from 6°C to just above the freezing temperature of water. Samples that are hand delivered, immediately following collection, may not meet these criteria; however, they will be considered acceptable according to NELAC and State standards, if there is evidence that the chilling process has begun, such as stored and transported to the laboratory on ice.

#### **DISSOLVED METALS**

Samples OC-GW-CA1 (360-37552-1), OC-GW-42S (360-37552-2), OC-GW-43SR (360-37552-3), OC-GW-34SR (360-37552-4), OC-GW-34D (360-37552-5), OC-GW-202S (360-37552-6), OC-GW-202D (360-37552-7), OC-PZ-24 (360-37552-8) and OC-PZ-25 (360-37552-9) were analyzed for dissolved metals in accordance with EPA SW-846 Method 6010B. The samples were analyzed on 11/15/2011 and 11/16/2011.

At the request of the client, an abbreviated/modified MCP analyte list was reported for this job.

No difficulties were encountered during the dissolved metals analyses.

All quality control parameters were within the acceptance limits.

#### **SPECIFIC CONDUCTIVITY**

Samples OC-GW-CA1 (360-37552-1), OC-GW-42S (360-37552-2), OC-GW-43SR (360-37552-3), OC-GW-34SR (360-37552-4), OC-GW-34D (360-37552-5), OC-GW-202S (360-37552-6), OC-GW-202D (360-37552-7), OC-PZ-24 (360-37552-8) and OC-PZ-25 (360-37552-9) were analyzed for specific conductivity in accordance with SM20 2510B. The samples were analyzed on 11/19/2011.

No difficulties were encountered during the conductivity analyses.

All quality control parameters were within the acceptance limits.

#### **ANIONS (28 DAY HOLD TIME)**

Samples OC-GW-CA1 (360-37552-1), OC-GW-42S (360-37552-2), OC-GW-43SR (360-37552-3), OC-GW-34SR (360-37552-4), OC-GW-34D (360-37552-5), OC-GW-202S (360-37552-6), OC-GW-202D (360-37552-7), OC-PZ-24 (360-37552-8) and OC-PZ-25 (360-37552-9) were analyzed for anions (28 day hold time) in accordance with EPA Method 300.0. The samples were analyzed on 11/19/2011, 11/28/2011 and 11/30/2011.

Sulfate failed the recovery criteria low for the MSD of sample 360-37526-3 in batch 360-84080.

Refer to the QC report for details.

Samples OC-GW-CA1 (360-37552-1)[10X], OC-GW-42S (360-37552-2)[10X], OC-GW-43SR (360-37552-3)[10X], OC-GW-202S (360-37552-6)[10X], OC-GW-202D (360-37552-7)[50X], OC-PZ-24 (360-37552-8)[10X] and OC-PZ-25 (360-37552-9)[10X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

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#### **Case Narrative**

Client: Olin Corporation

Project/Site: Olin Chemical Groundwater

TestAmerica Job ID: 360-37552-1

#### Job ID: 360-37552-1 (Continued)

#### Laboratory: TestAmerica Westfield (Continued)

No other difficulties were encountered during the anions analyses.

All other quality control parameters were within the acceptance limits.

#### **AMMONIA**

Samples OC-GW-CA1 (360-37552-1), OC-GW-42S (360-37552-2), OC-GW-43SR (360-37552-3), OC-GW-34SR (360-37552-4), OC-GW-34D (360-37552-5), OC-GW-202S (360-37552-6), OC-GW-202D (360-37552-7), OC-PZ-24 (360-37552-8) and OC-PZ-25 (360-37552-9) were analyzed for ammonia in accordance with Lachat 107-06-1B. The samples were prepared and analyzed on 11/23/2011.

Ammonia failed the recovery criteria high for the MSD of sample 360-37526-8 in batch 360-83913. The presence of the '4' qualifier in the report indicates analytes where the concentration in the unspiked sample exceeded four times the spiking amount.

Refer to the QC report for details.

Samples OC-GW-202S (360-37552-6)[10X], OC-GW-202D (360-37552-7)[50X], OC-PZ-24 (360-37552-8)[10X] and OC-PZ-25 (360-37552-9)[10X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No other difficulties were encountered during the ammonia analyses.

All other quality control parameters were within the acceptance limits.

		IVIASS	SDEP Analytica	i Protocoi Certii	ication Form			
Labor	atory Name:	TestAmeric	ca Westfield	Project #:	360-3755	52-1		
Proje	ect Location:	Wilmin	gton MA	RTN:				
This f	orm provide	es certifications for	the following dat	a set: list Laborato	ry Sample ID Number(s):			
360-3 <sup>-</sup>	7552-1[1-9]							
Matric	es: X	Groundwater/Surfa	ce Water	Soil/Sediment	Drinking Water ☐Air	Oth	ner:	$\Box$
		(check all that ap	· • · · · · · · · · · · · · · · · · · ·					
8260 \	VOC	7470/7471 Hg	Mass DEP VPH	8081 Pesticides	7196 Hex Cr	Mass DEF	PAPH	
CAM		CAM III B	CAM IV A	CAM V B	CAM VI B	CAM IX A		
	SVOC	7010 Metals	Mass DEP EPH	8151 Herbicides	8330 Explosives	TO-15 VO		
CAM	IIB 📙	CAM III C	CAM IV B	CAM V C 9014 Total	CAM VIII A	CAM IX B		$\dashv$
6010 I	Metals	6020 Metals	8082 PCB	Cyanide/PAC	332.0 Perchlorate			
CAM I		CAM III D	CAM V A	CAM VI A	CAM VIII B			
	Affirmative	Responses to Que	estions A through	F are required for "	Presumptive Certainty" st	atus		
	Were all san	nples received in a	condition consistent	t with those describe	d on the Chain-of-Custody,			П
Α	, , , ,	, ,	mperature) in the fi	eld or laboratory, and	d prepared/analyzed within			
	method hold					X Yes	No	2
В	Were the an protocol(s) for		nd all associated Q	C requirements spec	cified in the selected CAM	XYes	□ No	0
С	Were all reg	uired corrective acti	ons and analytical i	response actions spe	ecified in the selected CAM			ī
C				ce standard non-cor		X Yes	☐ No	5
					pecified in CAM VII A,			
D	"Quality Ass  Data"?	urance and Quality	Control Guidelines	for the Acquisition ar	nd Reporting of Analytical	X Yes		_
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Ε				for a list of significan		Yes	∐ No	נ
	b. APH and	TO-15 Methods only	y: Was the complete	e analyte list reporte	d for each method?	Yes	No	<u></u>
F					onformances identified and		□	
				o" responses to Ques	stions A through E)? sumptive Certainty" statu	XYes	□ No	<u> </u>
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is accı	urate and con	nplete.						_
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Printe	d Name:	Steven C.	Hartmann	_ Date:	12/2/11 1	3:52		
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Client: Olin Corporation

Project/Site: Olin Chemical Groundwater

TestAmerica Job ID: 360-37552-1

Client Sample ID: OC-GW-CA1	Lab Sample ID: 360-37552-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	17	J	100	13	ug/L	1	_	6010B	Dissolved
Chromium	6.6		5.0	0.65	ug/L	1		6010B	Dissolved
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	93		20	20	mg/L	10	_	300.0	Total/NA
Chloride	9.6		1.0	1.0	mg/L	1		300.0	Total/NA
Ammonia	0.77		0.10	0.10	mg/L	1		L107-06-1B	Total/NA
Specific Conductance	690		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

## Client Sample ID: OC-GW-42S Lab Sample ID: 360-37552-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	450		100	13	ug/L	1	_	6010B	Dissolved
Chromium	7.9		5.0	0.65	ug/L	1		6010B	Dissolved
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	12		2.0	2.0	mg/L	1	_	300.0	Total/NA
Chloride	120		10	10	mg/L	10		300.0	Total/NA
Ammonia	1.0		0.10	0.10	mg/L	1		L107-06-1B	Total/NA
Specific Conductance	500		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

## Client Sample ID: OC-GW-43SR Lab Sample ID: 360-37552-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	53	J	100	13	ug/L	1	_	6010B	Dissolved
Chromium	1.2	J	5.0	0.65	ug/L	1		6010B	Dissolved
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	32		2.0	2.0	mg/L	1	_	300.0	Total/NA
Chloride	180		10	10	mg/L	10		300.0	Total/NA
Ammonia	2.5		0.10	0.10	mg/L	1		L107-06-1B	Total/NA
Specific Conductance	730		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

## Client Sample ID: OC-GW-34SR Lab Sample ID: 360-37552-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	1.4	J	5.0	0.65	ug/L	1	_	6010B	Dissolved
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	7.9		2.0	2.0	mg/L	1	_	300.0	Total/NA
Chloride	2.3		1.0	1.0	mg/L	1		300.0	Total/NA
Ammonia	0.21		0.10	0.10	mg/L	1		L107-06-1B	Total/NA
Specific Conductance	79		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

## Client Sample ID: OC-GW-34D Lab Sample ID: 360-37552-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	15		10	1.3	ug/L	2		6010B	Dissolved
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	60		2.0	2.0	mg/L	1	_	300.0	Total/NA
Chloride	4.9		1.0	1.0	mg/L	1		300.0	Total/NA
Ammonia	20		0.10	0.10	mg/L	1		L107-06-1B	Total/NA
Specific Conductance	250		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

Client Sample ID: OC-GW-202S Lab Sample ID: 30	0-37552-6
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## **Detection Summary**

Client: Olin Corporation

Project/Site: Olin Chemical Groundwater

Client Sample ID: OC-GW-202S (Continued)

TestAmerica Job ID: 360-37552-1

Lab Sample ID: 360-37552-6

Analyte	Posult	Qualifier	RL	MDL	Unit	Dil Fac	n	Method	Prep Type
Chromium	4.8		5.0	0.65		1	_	6010B	Dissolved
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	330		20	20	mg/L		_	300.0	Total/NA
Chloride	45		1.0	1.0	mg/L	1		300.0	Total/NA
Ammonia	60		1.0	1.0	mg/L	10		L107-06-1B	Total/NA
Specific Conductance	1100		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

Client Sample ID: OC-GW-202D Lab Sample ID: 360-37552-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	13000		200	25	ug/L	2	_	6010B	Dissolved
Chromium	1000		10	1.3	ug/L	2		6010B	Dissolved
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	1700		100	100	mg/L	50	_	300.0	Total/NA
Chloride	260		50	50	mg/L	50		300.0	Total/NA
Ammonia	300		5.0	5.0	mg/L	50		L107-06-1B	Total/NA
Specific Conductance	4400		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

Client Sample ID: OC-PZ-24 Lab Sample ID: 360-37552-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	18		5.0	0.65	ug/L	1	_	6010B	Dissolved
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	690		20	20	mg/L	10	_	300.0	Total/NA
Chloride	23		1.0	1.0	mg/L	1		300.0	Total/NA
Ammonia	73		1.0	1.0	mg/L	10		L107-06-1B	Total/NA
Specific Conductance	2000		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

Client Sample ID: OC-PZ-25 Lab Sample ID: 360-37552-9

Analyte	Result Qu	ualifier RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	9.9	5.0	0.65	ug/L	1	_	6010B	Dissolved
Analyte	Result Qu	ualifier RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	490	20	20	mg/L	10	_	300.0	Total/NA
Chloride	21	1.0	1.0	mg/L	1		300.0	Total/NA
Ammonia	51	1.0	1.0	mg/L	10		L107-06-1B	Total/NA
Specific Conductance	1400	1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

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## **Method Summary**

Client: Olin Corporation

Project/Site: Olin Chemical Groundwater

TestAmerica Job ID: 360-37552-1

Method	Method Description	Protocol	Laboratory
6010B	Dissolved Metals	SW846	TAL WFD
300.0	Chloride & Sulfate	40CFR136A	TAL WFD
L107-06-1B	Nitrogen Ammonia	LACHAT	TAL WFD
SM 2510B	Conductivity, Specific Conductance	SM	TAL WFD

#### **Protocol References:**

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.

LACHAT = LACHAT

SM = "Standard Methods For The Examination Of Water And Wastewater",

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

#### Laboratory References:

TAL WFD = TestAmerica Westfield, Westfield Executive Park, 53 Southampton Road, Westfield, MA 01085, TEL (413)572-4000

## **Sample Summary**

Client: Olin Corporation

Project/Site: Olin Chemical Groundwater

TestAmerica Job ID: 360-37552-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
360-37552-1	OC-GW-CA1	Water	11/10/11 10:50	11/10/11 18:20
360-37552-2	OC-GW-42S	Water	11/10/11 09:50	11/10/11 18:20
360-37552-3	OC-GW-43SR	Water	11/10/11 08:45	11/10/11 18:20
360-37552-4	OC-GW-34SR	Water	11/10/11 11:35	11/10/11 18:20
360-37552-5	OC-GW-34D	Water	11/10/11 12:20	11/10/11 18:20
360-37552-6	OC-GW-202S	Water	11/10/11 10:10	11/10/11 18:20
360-37552-7	OC-GW-202D	Water	11/10/11 09:35	11/10/11 18:20
360-37552-8	OC-PZ-24	Water	11/10/11 11:10	11/10/11 18:20
360-37552-9	OC-PZ-25	Water	11/10/11 11:40	11/10/11 18:20

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Client: Olin Corporation

Project/Site: Olin Chemical Groundwater

TestAmerica Job ID: 360-37552-1

**Matrix: Water** 

**Matrix: Water** 

**Matrix: Water** 

**Matrix: Water** 

**Matrix: Water** 

Method: 6010B - Dissolved Metals - Dissolved

Client Sample ID: OC-GW-CA1 Lab Sample ID: 360-37552-1

Date Collected: 11/10/11 10:50 **Matrix: Water** 

Date Received: 11/10/11 18:20

Analyte Result Qualifier RL MDL Unit D Analyzed Dil Fac Prepared 100 13 ug/L 11/15/11 18:25 **Aluminum** 17 J 5.0 Chromium 6.6 0.65 ug/L 11/15/11 18:25

Client Sample ID: OC-GW-42S Lab Sample ID: 360-37552-2

Date Collected: 11/10/11 09:50 Date Received: 11/10/11 18:20

Analyte Result Qualifier RL MDL Unit D Prepared Analyzed Dil Fac 100 450 13 ug/L 11/15/11 18:37 **Aluminum** Chromium 7.9 5.0 0.65 ug/L 11/15/11 18:37

Client Sample ID: OC-GW-43SR Lab Sample ID: 360-37552-3

Date Collected: 11/10/11 08:45 **Matrix: Water** 

Date Received: 11/10/11 18:20

Result Qualifier RL MDL Unit D Dil Fac Analyte Prepared Analyzed 100 13 ug/L 11/15/11 18:40 **Aluminum** 53 Chromium 1.2 J 5.0 0.65 ug/L 11/15/11 18:40

Client Sample ID: OC-GW-34SR Lab Sample ID: 360-37552-4

Date Collected: 11/10/11 11:35

Date Received: 11/10/11 18:20

Analyte Result Qualifier RL MDL Unit D Prepared Analyzed Dil Fac Aluminum ND 100 13 ug/L 11/15/11 18:43 Chromium 1.4 5.0 0.65 ug/L 11/15/11 18:43

Client Sample ID: OC-GW-34D Lab Sample ID: 360-37552-5 Date Collected: 11/10/11 12:20

Date Received: 11/10/11 18:20

Result Qualifier RL MDL Unit D Dil Fac Analyte Prepared Analyzed 200 ND 25 ug/L 11/16/11 19:20 Aluminum 2 10 11/16/11 19:20 Chromium 15 1.3 ug/L

Client Sample ID: OC-GW-202S Lab Sample ID: 360-37552-6

Date Collected: 11/10/11 10:10

Date Received: 11/10/11 18:20

Analyte Result Qualifier RL MDL Unit D Prepared Analyzed Dil Fac Aluminum ND 100 ug/L 13 11/15/11 18:54 Chromium 4.8 J 5.0 0.65 ug/L 11/15/11 18:54

Client Sample ID: OC-GW-202D Lab Sample ID: 360-37552-7

Date Collected: 11/10/11 09:35

Date Received: 11/10/11 18:20

Analyte Result Qualifier RL **MDL** Unit Prepared Analyzed Dil Fac 200 13000 25 ug/L 11/16/11 19:23 **Aluminum** 

> TestAmerica Westfield 12/2/2011

## **Client Sample Results**

Client: Olin Corporation

Project/Site: Olin Chemical Groundwater

TestAmerica Job ID: 360-37552-1

Method: 6010B - Dissolved Metals - Dissolved (Continued)

Client Sample ID: OC-GW-202D

Date Collected: 11/10/11 09:35 Date Received: 11/10/11 18:20

 Analyte
 Result Chromium
 Qualifier
 RL NDL Unit ug/L
 D Prepared ug/L
 Analyzed Dil Fac ug/L
 Dil Fac ug/L

Client Sample ID: OC-PZ-24

Date Collected: 11/10/11 11:10

Date Received: 11/10/11 18:20

Result Qualifier RL MDL Unit D Dil Fac Analyte Prepared Analyzed ND 100 Aluminum 13 ug/L 11/15/11 19:00 Chromium 18 5.0 0.65 ug/L 11/15/11 19:00

Client Sample ID: OC-PZ-25

Date Collected: 11/10/11 11:40

Date Received: 11/10/11 18:20

Result Qualifier RL MDL Unit Analyte D Prepared Analyzed Dil Fac Aluminum ND 100 13 ug/L 11/15/11 19:03 5.0 Chromium 9.9 0.65 ug/L 11/15/11 19:03

-tA-----i--- lab ID: 200 27552 4

Lab Sample ID: 360-37552-7

Lab Sample ID: 360-37552-8

Lab Sample ID: 360-37552-9

**Matrix: Water** 

**Matrix: Water** 

**Matrix: Water** 

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Client: Olin Corporation

Project/Site: Olin Chemical Groundwater

## **General Chemistry**

Client Sample ID: OC-GW-CA1

Date Collected: 11/10/11 10:50 Date Received: 11/10/11 18:20

Lab Sample ID: 360-37552-1

Lab Sample ID: 360-37552-2

**Matrix: Water** 

**Matrix: Water** 

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	93		20	20	mg/L			11/28/11 22:10	10
Chloride	9.6		1.0	1.0	mg/L			11/19/11 08:14	1
Ammonia	0.77		0.10	0.10	mg/L		11/23/11 09:19	11/23/11 14:33	1
Specific Conductance	690		1.0	1.0	umhos/cm			11/19/11 08:25	1

Client Sample ID: OC-GW-42S

Date Collected: 11/10/11 09:50

Date Received: 11/10/11 18:20

Dil Fac Analyte Result Qualifier RL RL Unit Prepared Analyzed Sulfate 12 2.0 2.0 mg/L 11/19/11 08:31 10 10 mg/L 11/28/11 21:38 10 Chloride 120 **Ammonia** 1.0 0.10 0.10 mg/L 11/23/11 09:19 11/23/11 14:34 1.0 1.0 umhos/cm 11/19/11 08:26 **Specific Conductance** 500

Client Sample ID: OC-GW-43SR

Date Collected: 11/10/11 08:45

Date Received: 11/10/11 18:20

Lab Sample ID: 360-37552-3

Lab Sample ID: 360-37552-4

**Matrix: Water** 

**Matrix: Water** 

Analyte Result Qualifier RL **RL** Unit D Prepared Analyzed Dil Fac Sulfate 32 2.0 2.0 mg/L 11/19/11 08:47 Chloride 180 10 10 mg/L 11/28/11 21:54 10 0.10 0.10 mg/L 11/23/11 09:19 11/23/11 14:37 **Ammonia** 2.5 **Specific Conductance** 730 1.0 1.0 umhos/cm 11/19/11 08:27

Client Sample ID: OC-GW-34SR

Date Collected: 11/10/11 11:35

Date Received: 11/10/11 18:20

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	7.9		2.0	2.0	mg/L			11/19/11 09:03	1
Chloride	2.3		1.0	1.0	mg/L			11/19/11 09:03	1
Ammonia	0.21		0.10	0.10	mg/L		11/23/11 09:19	11/23/11 14:38	1
Specific Conductance	79		1.0	1.0	umhos/cm			11/19/11 08:29	1

Client Sample ID: OC-GW-34D Lab Sample ID: 360-37552-5 Date Collected: 11/10/11 12:20 **Matrix: Water** 

Date Received: 11/10/11 18:20

Analyte	Result	Qualifier RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	60	2.0	2.0	mg/L			11/19/11 09:19	1
Chloride	4.9	1.0	1.0	mg/L			11/19/11 09:19	1
Ammonia	20	0.10	0.10	mg/L		11/23/11 09:19	11/23/11 14:39	1
Specific Conductance	250	1.0	1.0	umhos/cm			11/19/11 08:30	1

TestAmerica Westfield 12/2/2011

## **Client Sample Results**

Client: Olin Corporation

Project/Site: Olin Chemical Groundwater

TestAmerica Job ID: 360-37552-1

**General Chemistry** 

Client Sample ID: OC-GW-202S

Date Collected: 11/10/11 10:10 Date Received: 11/10/11 18:20

Lab Sample ID: 360-37552-6

**Matrix: Water** 

Analyte Result Qualifier RL **RL** Unit D Prepared Analyzed Dil Fac 11/28/11 22:26 20 **Sulfate** 330 20 mg/L 10 Chloride 45 1.0 1.0 mg/L 11/19/11 09:35 1.0 11/23/11 15:04 1.0 mg/L 11/23/11 09:19 10 **Ammonia** 60 **Specific Conductance** 1100 1.0 1.0 umhos/cm 11/19/11 08:32

Lab Sample ID: 360-37552-7

**Matrix: Water** 

Client Sample ID: OC-GW-202D Date Collected: 11/10/11 09:35 Date Received: 11/10/11 18:20

Analyte Result Qualifier RL RL Unit D Dil Fac Prepared Analyzed Sulfate 1700 100 100 mg/L 11/30/11 09:23 50 11/30/11 09:23 50 50 Chloride 260 mg/L 300 5.0 mg/L 11/23/11 09:19 11/23/11 15:12 50 **Ammonia** 1.0 1.0 umhos/cm 11/19/11 08:33 **Specific Conductance** 4400

Client Sample ID: OC-PZ-24 Lab Sample ID: 360-37552-8

Date Collected: 11/10/11 11:10 **Matrix: Water** 

Date Received: 11/10/11 18:20

Analyte Result Qualifier RL RL Unit Analyzed Dil Fac Prepared 20 20 11/28/11 22:42 mg/L 10 **Sulfate** 690 Chloride 23 1.0 mg/L 11/19/11 10:07 1.0 **Ammonia** 73 1.0 mg/L 11/23/11 09:19 11/23/11 15:06 10 **Specific Conductance** 2000 1.0 1.0 umhos/cm 11/19/11 08:39

Client Sample ID: OC-PZ-25 Lab Sample ID: 360-37552-9 Date Collected: 11/10/11 11:40 **Matrix: Water** 

Date Received: 11/10/11 18:20

Analyte	Result C	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	490		20	20	mg/L	_		11/19/11 12:48	10
Chloride	21		1.0	1.0	mg/L			11/19/11 12:32	1
Ammonia	51		1.0	1.0	mg/L		11/23/11 09:19	11/23/11 15:07	10
Specific Conductance	1400		1.0	1.0	umhos/cm			11/19/11 08:42	1

## **Definitions/Glossary**

Client: Olin Corporation

Project/Site: Olin Chemical Groundwater

TestAmerica Job ID: 360-37552-1

#### **Qualifiers**

#### Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
☼	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CNF	Contains no Free Liquid
DL, RA, RE, IN	Indicates a Dilution, Reanalysis, Re-extraction, or additional Initial metals/anion analysis of the sample
EDL	Estimated Detection Limit
EPA	United States Environmental Protection Agency
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
RL	Reporting Limit
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

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## **QC Association Summary**

Client: Olin Corporation

Project/Site: Olin Chemical Groundwater

TestAmerica Job ID: 360-37552-1

#### **Metals**

#### Analysis Batch: 83422

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37552-1	OC-GW-CA1	Dissolved	Water	6010B	
360-37552-1 DU	OC-GW-CA1	Dissolved	Water	6010B	
360-37552-1 MS	OC-GW-CA1	Dissolved	Water	6010B	
360-37552-2	OC-GW-42S	Dissolved	Water	6010B	
360-37552-3	OC-GW-43SR	Dissolved	Water	6010B	
360-37552-4	OC-GW-34SR	Dissolved	Water	6010B	
360-37552-6	OC-GW-202S	Dissolved	Water	6010B	
360-37552-8	OC-PZ-24	Dissolved	Water	6010B	
360-37552-9	OC-PZ-25	Dissolved	Water	6010B	
LCS 360-83422/1	Lab Control Sample	Total/NA	Water	6010B	
LCSD 360-83422/10	Lab Control Sample Dup	Total/NA	Water	6010B	
MB 360-83422/2	Method Blank	Total/NA	Water	6010B	

#### Analysis Batch: 83502

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Bato
360-37552-5	OC-GW-34D	Dissolved	Water	6010B	
360-37552-7	OC-GW-202D	Dissolved	Water	6010B	
LCS 360-83502/1	Lab Control Sample	Total/NA	Water	6010B	
LCSD 360-83502/9	Lab Control Sample Dup	Total/NA	Water	6010B	
MB 360-83502/2	Method Blank	Total/NA	Water	6010B	

## **General Chemistry**

#### Analysis Batch: 83626

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Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37552-1	OC-GW-CA1	Total/NA	Water	SM 2510B	
360-37552-2	OC-GW-42S	Total/NA	Water	SM 2510B	
360-37552-3	OC-GW-43SR	Total/NA	Water	SM 2510B	
360-37552-4	OC-GW-34SR	Total/NA	Water	SM 2510B	
360-37552-5	OC-GW-34D	Total/NA	Water	SM 2510B	
360-37552-6	OC-GW-202S	Total/NA	Water	SM 2510B	
360-37552-7	OC-GW-202D	Total/NA	Water	SM 2510B	
360-37552-8	OC-PZ-24	Total/NA	Water	SM 2510B	
360-37552-8 DU	OC-PZ-24	Total/NA	Water	SM 2510B	
360-37552-9	OC-PZ-25	Total/NA	Water	SM 2510B	
LCS 360-83626/1	Lab Control Sample	Total/NA	Water	SM 2510B	
MB 360-83626/3	Method Blank	Total/NA	Water	SM 2510B	

## Analysis Batch: 83764

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37552-1	OC-GW-CA1	Total/NA	Water	300.0	
360-37552-2	OC-GW-42S	Total/NA	Water	300.0	
360-37552-3	OC-GW-43SR	Total/NA	Water	300.0	
360-37552-4	OC-GW-34SR	Total/NA	Water	300.0	
360-37552-5	OC-GW-34D	Total/NA	Water	300.0	
360-37552-6	OC-GW-202S	Total/NA	Water	300.0	
360-37552-8	OC-PZ-24	Total/NA	Water	300.0	
LCS 360-83764/6	Lab Control Sample	Total/NA	Water	300.0	
MB 360-83764/5	Method Blank	Total/NA	Water	300.0	

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TestAmerica Job ID: 360-37552-1

Client: Olin Corporation

Project/Site: Olin Chemical Groundwater

## **General Chemistry (Continued)**

## Analysis Batch: 83765

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37552-9	OC-PZ-25	Total/NA	Water	300.0	
360-37552-9	OC-PZ-25	Total/NA	Water	300.0	
LCS 360-83765/6	Lab Control Sample	Total/NA	Water	300.0	
MB 360-83765/5	Method Blank	Total/NA	Water	300.0	

#### Prep Batch: 83810

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37552-1	OC-GW-CA1	Total/NA	Water	Distill/Ammonia	
360-37552-2	OC-GW-42S	Total/NA	Water	Distill/Ammonia	
360-37552-3	OC-GW-43SR	Total/NA	Water	Distill/Ammonia	
360-37552-4	OC-GW-34SR	Total/NA	Water	Distill/Ammonia	
360-37552-5	OC-GW-34D	Total/NA	Water	Distill/Ammonia	
360-37552-6	OC-GW-202S	Total/NA	Water	Distill/Ammonia	
360-37552-7	OC-GW-202D	Total/NA	Water	Distill/Ammonia	
360-37552-8	OC-PZ-24	Total/NA	Water	Distill/Ammonia	
360-37552-9	OC-PZ-25	Total/NA	Water	Distill/Ammonia	
LCS 360-83810/2-A	Lab Control Sample	Total/NA	Water	Distill/Ammonia	
MB 360-83810/1-A	Method Blank	Total/NA	Water	Distill/Ammonia	

#### Analysis Batch: 83913

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37552-1	OC-GW-CA1	Total/NA	Water	L107-06-1B	83810
360-37552-2	OC-GW-42S	Total/NA	Water	L107-06-1B	83810
360-37552-3	OC-GW-43SR	Total/NA	Water	L107-06-1B	83810
360-37552-4	OC-GW-34SR	Total/NA	Water	L107-06-1B	83810
360-37552-5	OC-GW-34D	Total/NA	Water	L107-06-1B	83810
360-37552-6	OC-GW-202S	Total/NA	Water	L107-06-1B	83810
360-37552-7	OC-GW-202D	Total/NA	Water	L107-06-1B	83810
360-37552-8	OC-PZ-24	Total/NA	Water	L107-06-1B	83810
360-37552-9	OC-PZ-25	Total/NA	Water	L107-06-1B	83810
LCS 360-83810/2-A	Lab Control Sample	Total/NA	Water	L107-06-1B	83810
MB 360-83810/1-A	Method Blank	Total/NA	Water	L107-06-1B	83810

#### Analysis Batch: 84080

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37552-1	OC-GW-CA1	Total/NA	Water	300.0	
360-37552-2	OC-GW-42S	Total/NA	Water	300.0	
360-37552-3	OC-GW-43SR	Total/NA	Water	300.0	
360-37552-6	OC-GW-202S	Total/NA	Water	300.0	
360-37552-8	OC-PZ-24	Total/NA	Water	300.0	
LCS 360-84080/4	Lab Control Sample	Total/NA	Water	300.0	
MB 360-84080/3	Method Blank	Total/NA	Water	300.0	

## Analysis Batch: 84154

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method Prep	Batch
360-37552-7	OC-GW-202D	Total/NA	Water	300.0	
360-37552-7 MS	OC-GW-202D	Total/NA	Water	300.0	
360-37552-7 MSD	OC-GW-202D	Total/NA	Water	300.0	
LCS 360-84154/4	Lab Control Sample	Total/NA	Water	300.0	
MB 360-84154/3	Method Blank	Total/NA	Water	300.0	

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TestAmerica Job ID: 360-37552-1

Client: Olin Corporation

Project/Site: Olin Chemical Groundwater

Method: 6010B - Dissolved Metals

Lab Sample ID: MB 360-83422/2

**Matrix: Water** 

Analyte

Aluminum

Chromium

**Analysis Batch: 83422** 

Client Sample ID: Method Blank Prep Type: Total/NA

мв мв Result Qualifier RL MDL Unit Dil Fac D Prepared Analyzed 100 ND 13 ug/L 11/15/11 18:13 ND 11/15/11 18:13 5.0 0.65 ug/L

Lab Sample ID: LCS 360-83422/1 **Client Sample ID: Lab Control Sample** 

**Matrix: Water** Prep Type: Total/NA

**Analysis Batch: 83422** 

LCS LCS %Rec. Spike Analyte Added Result Qualifier Unit %Rec Limits Aluminum 5000 5050 ug/L 101 80 - 120 Chromium 1000 1030 ug/L 103 80 - 120

Lab Sample ID: LCSD 360-83422/10 Client Sample ID: Lab Control Sample Dup

**Matrix: Water** Prep Type: Total/NA

**Analysis Batch: 83422** 

Spike LCSD LCSD %Rec. RPD Analyte Added Result Qualifier Unit D %Rec Limits **RPD** Limit Aluminum 5000 5280 106 80 - 120 ug/L 20 Chromium 1000 1070 107 80 - 120 ug/L 20

Lab Sample ID: MB 360-83502/2 Client Sample ID: Method Blank Prep Type: Total/NA

**Matrix: Water** 

**Analysis Batch: 83502** 

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Result Qualifier RL MDL Unit D Dil Fac Analyte Prepared Analyzed 100 Aluminum ND 13 ug/L 11/16/11 18:36 ND 5.0 11/16/11 18:36 Chromium 0.65 ug/L

Lab Sample ID: LCS 360-83502/1 Client Sample ID: Lab Control Sample Prep Type: Total/NA

**Matrix: Water** 

**Analysis Batch: 83502** 

	Spike	LCS	LCS				%Rec.		
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits		
Aluminum	 5000	4980		ug/L		100	80 - 120		_
Chromium	1000	996		ug/L		100	80 - 120		

Lab Sample ID: LCSD 360-83502/9 Client Sample ID: Lab Control Sample Dup Prep Type: Total/NA

**Matrix: Water** 

**Analysis Batch: 83502** 

	\$	Spike L	CSD LC	CSD			%Rec.		RPD
Analyte	A	dded Re	esult Qu	ualifier Uni	t D	%Rec	Limits	RPD	Limit
Aluminum		5000	4640	ug/l		93	80 - 120	7	20
Chromium		1000	941	ug/l	_	94	80 - 120	6	20

Client Sample ID: OC-GW-CA1 Lab Sample ID: 360-37552-1 MS **Prep Type: Dissolved** 

**Matrix: Water** 

Analysis Batch: 83422										
	Sample	Sample	Spike	MS	MS				%Rec.	
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Aluminum	17	J	5000	5190		ug/L		103	75 - 125	
Chromium	6.6		1000	1040		ug/L		104	75 <sub>-</sub> 125	

TestAmerica Job ID: 360-37552-1

Client: Olin Corporation

Project/Site: Olin Chemical Groundwater

Method: 6010B - Dissolved Metals (Continued)

Lab Sample ID: 360-37552-1 DU

**Matrix: Water** 

Analyte Aluminum

Chromium

**Analysis Batch: 83422** 

Client Sample ID: OC-GW-CA1 **Prep Type: Dissolved** 

Client Sample ID: Method Blank

Client Sample ID: Lab Control Sample

Client Sample ID: Method Blank

Client Sample ID: Lab Control Sample

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Prep Type: Total/NA

Prep Type: Total/NA

Prep Type: Total/NA

Prep Type: Total/NA

20

Sample Sample DU DU RPD Result Qualifier RPD Limit Result Qualifier Unit D 17 J 18.4 J ug/L 10 20

ug/L

6.76

Method: 300.0 - Chloride & Sulfate

Lab Sample ID: MB 360-83764/5

**Matrix: Water** 

**Analysis Batch: 83764** 

MB MB

6.6

Analyte Result Qualifier RL **RL** Unit D Prepared Analyzed Dil Fac ND 20 Sulfate 20 mg/L 11/19/11 03:57 Chloride ND 1.0 1.0 mg/L 11/19/11 03:57

Lab Sample ID: LCS 360-83764/6

**Matrix: Water** 

Analysis Batch: 83764

Spike LCS LCS %Rec. Analyte Added Result Qualifier Unit D %Rec Limits Sulfate 80.0 83.2 mg/L 104 85 - 115 40.0 42.1 mg/L 105 85 - 115 Chloride

Lab Sample ID: MB 360-83765/5

**Matrix: Water** 

**Analysis Batch: 83765** 

MB MB

Result Qualifier RL RL Unit Dil Fac Analyte D Prepared Analyzed Sulfate ND 2.0 2.0 mg/L 11/19/11 10:56 Chloride ND 1.0 11/19/11 10:56 1.0 mg/L

Lab Sample ID: LCS 360-83765/6

**Matrix: Water** 

**Analysis Batch: 83765** 

•	Spike	LCS	LCS				%Rec.		
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits		
Sulfate	 80.0	83.1		mg/L		104	85 - 115		_
Chloride	40.0	42.0		ma/L		105	85 <sub>-</sub> 115		

Lab Sample ID: MB 360-84080/3

**Matrix: Water** 

Analysis Batch: 84080

Client Sample ID: Method Blank

**Client Sample ID: Lab Control Sample** 

Prep Type: Total/NA

мв мв Analyte Result Qualifier RL **RL** Unit D Prepared Analyzed Sulfate ND 2.0 2.0 mg/L 11/28/11 20:17

Dil Fac Chloride ND 1.0 11/28/11 20:17 1.0 mg/L

Lab Sample ID: LCS 360-84080/4

**Matrix: Water** 

**Analysis Batch: 84080** 

İ	-	Spike	LCS	LCS				%Rec.	
	Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
	Sulfate	80.0	77.4		mg/L	_	97	85 - 115	

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Prep Type: Total/NA

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Client Sample ID: Method Blank

**Client Sample ID: Lab Control Sample** 

Client Sample ID: OC-GW-202D

Client Sample ID: OC-GW-202D

Prep Type: Total/NA

Prep Type: Total/NA

Prep Type: Total/NA

Prep Type: Total/NA

Prep Type: Total/NA

Prep Batch: 83810

Client: Olin Corporation

Project/Site: Olin Chemical Groundwater

Method: 300.0 - Chloride & Sulfate (Continued)

Lab Sample ID: LCS 360-84080/4

Client Sample ID: Lab Control Sample **Matrix: Water** Prep Type: Total/NA **Analysis Batch: 84080** LCS LCS

Spike %Rec. Analyte Added Result Qualifier Unit Limits D %Rec Chloride 40.0 39.8 mg/L 85 - 115 99

Lab Sample ID: MB 360-84154/3

**Matrix: Water** 

Analysis Batch: 84154

	MB	MB							
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	ND		2.0	2.0	mg/L			11/30/11 08:19	1
Chloride	ND		1.0	1.0	mg/L			11/30/11 08:19	1

Lab Sample ID: LCS 360-84154/4

**Matrix: Water** 

Analysis Batch: 84154

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Sulfate	 80.0	78.0		mg/L		97	85 - 115	
Chloride	40.0	41.2		mg/L		103	85 _ 115	

Lab Sample ID: 360-37552-7 MS

**Matrix: Water** 

Analysis Batch: 84154

•	Sample	Sample	Spike	MS	MS				%Rec.	
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Sulfate	1700		1000	2840		mg/L	_	109	75 - 125	
Chloride	260		500	817		mg/L		110	75 <sub>-</sub> 125	

Lab Sample ID: 360-37552-7 MSD

**Matrix: Water** 

**Analysis Batch: 84154** 

•	Sample	Sample	Spike	MSD	MSD				%Rec.		RPD
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Sulfate	1700		1000	2670		mg/L		93	75 - 125	6	20
Chloride	260		500	778		mg/L		103	75 - 125	5	20

Method: L107-06-1B - Nitrogen Ammonia

Lab Sample ID: MB 360-83810/1-A Client Sample ID: Method Blank

**Matrix: Water** 

**Analysis Batch: 83913** 

	IVID IVID							
Analyte	Result Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	ND ND	0.10	0.10	ma/L		11/23/11 09:19	11/23/11 14:25	1

Lab Sample ID: LCS 360-83810/2-A Client Sample ID: Lab Control Sample **Matrix: Water** Prep Type: Total/NA Prep Batch: 83810

**Analysis Batch: 83913** Spike LCS LCS %Rec.

Added Result Qualifier Unit Limits Analyte D %Rec 10.0 90 - 110 Ammonia 10.4 mg/L 104

## **QC Sample Results**

Client: Olin Corporation TestAmerica Job ID: 360-37552-1

Project/Site: Olin Chemical Groundwater

10

Method: SM 2510B - Conductivity, Specific Conductance

Lab Sample ID: MB 360-83626/3

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 83626

 Analyte
 Result
 Qualifier
 RL
 RL
 Unit
 D
 Prepared
 Analyzed
 Dil Fac

 Specific Conductance
 ND
 1.0
 1.0
 umhos/cm
 1.1/19/11 08:19
 1

Lab Sample ID: LCS 360-83626/1

Matrix: Water

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analysis Batch: 83626

Spike LCS LCS %Rec. Analyte Added Result Qualifier Limits Unit D %Rec Specific Conductance 1410 1400 umhos/cm 99 85 - 115

Lab Sample ID: 360-37552-8 DU

Matrix: Water

Client Sample ID: OC-PZ-24

Prep Type: Total/NA

Analysis Batch: 83626

Sample Sample DU DU RPD
Analyte Result Qualifier Result Qualifier Unit D RPD Limit

 Specific Conductance
 2000
 1960
 umhos/cm
 0.2
 20

	Comments					\											
	Units						\				ls.						
Serial Dilution	Final Volume 2																
Serial	Units						\										
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	LIMs Sample ID	3-252-5	37552-7										<b>b</b>				
	Method	0109	?		·										1.		
	Date	11-91-11	÷														
	Analyst Initials	XX	, ->						Page	, 21	of 33	B					

11-16-15

Date:

Analytical Dilution Preparation Log

**TestAmerica Westfield** 

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1 C2 COK 1 mh 1 37572685 10x 1 mh 1 co				C7	20%	200	LLL							
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TestAmerica Westfield

**Analytical Dilution Preparation Log** 

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TestAmerica Westfield **Analytical Dilution Preparation Log** 

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TZ/Z/Z011

Client: Olin Corporation

Project/Site: Olin Chemical Groundwater

Client Sample ID: OC-GW-CA1

Date Collected: 11/10/11 10:50 Date Received: 11/10/11 18:20 Lab Sample ID: 360-37552-1

Matrix: Water

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B			83422	11/15/11 18:25	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83626	11/19/11 08:25	AMS	TAL WFD
Total/NA	Analysis	300.0		1	83764	11/19/11 08:14	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			83810	11/23/11 09:19	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		1	83913	11/23/11 14:33	RWE	TAL WFD
Total/NA	Analysis	300.0		10	84080	11/28/11 22:10	RWE	TAL WFD

Client Sample ID: OC-GW-42S

Date Collected: 11/10/11 09:50

Date Received: 11/10/11 18:20

Lab Sample ID: 360-37552-2

Matrix: Water

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B		1	83422	11/15/11 18:37	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83626	11/19/11 08:26	AMS	TAL WFD
Total/NA	Analysis	300.0		1	83764	11/19/11 08:31	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			83810	11/23/11 09:19	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		1	83913	11/23/11 14:34	RWE	TAL WFD
Total/NA	Analysis	300.0		10	84080	11/28/11 21:38	RWE	TAL WFD

Client Sample ID: OC-GW-43SR

Date Collected: 11/10/11 08:45

Date Received: 11/10/11 18:20

Lab Sample ID: 360-37552-3

**Matrix: Water** 

_	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B			83422	11/15/11 18:40	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83626	11/19/11 08:27	AMS	TAL WFD
Total/NA	Analysis	300.0		1	83764	11/19/11 08:47	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			83810	11/23/11 09:19	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		1	83913	11/23/11 14:37	RWE	TAL WFD
Total/NA	Analysis	300.0		10	84080	11/28/11 21:54	RWE	TAL WFD

Client Sample ID: OC-GW-34SR

Date Collected: 11/10/11 11:35

Date Received: 11/10/11 18:20

Lab Sample	ID: 360-37552-4
	Matrix: Water

		Batch	Batch		Dilution	Batch	Prepared		
F	Ргер Туре	Туре	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
[	Dissolved	Analysis	6010B		1	83422	11/15/11 18:43	TJS	TAL WFD
1	Total/NA	Analysis	SM 2510B		1	83626	11/19/11 08:29	AMS	TAL WFD
1	Total/NA	Analysis	300.0		1	83764	11/19/11 09:03	RWE	TAL WFD
T	Total/NA	Prep	Distill/Ammonia			83810	11/23/11 09:19	RWE	TAL WFD
L	「otal/NA	Analysis	L107-06-1B		1	83913	11/23/11 14:38	RWE	TAL WFD

Client: Olin Corporation

Project/Site: Olin Chemical Groundwater

Client Sample ID: OC-GW-34D

Date Collected: 11/10/11 12:20 Date Received: 11/10/11 18:20

Lab Sample ID: 360-37552-5

Matrix: Water

**Matrix: Water** 

**Matrix: Water** 

**Matrix: Water** 

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B		2	83502	11/16/11 19:20	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83626	11/19/11 08:30	AMS	TAL WFD
Total/NA	Analysis	300.0		1	83764	11/19/11 09:19	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			83810	11/23/11 09:19	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		1	83913	11/23/11 14:39	RWE	TAL WFD

Client Sample ID: OC-GW-202S Lab Sample ID: 360-37552-6

Date Collected: 11/10/11 10:10

Date Received: 11/10/11 18:20

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B			83422	11/15/11 18:54	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83626	11/19/11 08:32	AMS	TAL WFD
Total/NA	Analysis	300.0		1	83764	11/19/11 09:35	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			83810	11/23/11 09:19	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		10	83913	11/23/11 15:04	RWE	TAL WFD
Total/NA	Analysis	300.0		10	84080	11/28/11 22:26	RWE	TAL WFD

Client Sample ID: OC-GW-202D Lab Sample ID: 360-37552-7

Date Collected: 11/10/11 09:35

Date Received: 11/10/11 18:20

_	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B		2	83502	11/16/11 19:23	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83626	11/19/11 08:33	AMS	TAL WFD
Total/NA	Prep	Distill/Ammonia			83810	11/23/11 09:19	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		50	83913	11/23/11 15:12	RWE	TAL WFD
Total/NA	Analysis	300.0		50	84154	11/30/11 09:23	AMS	TAL WFD

Client Sample ID: OC-PZ-24 Lab Sample ID: 360-37552-8

Date Collected: 11/10/11 11:10

Date Received: 11/10/11 18:20

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B			83422	11/15/11 19:00	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83626	11/19/11 08:39	AMS	TAL WFD
Total/NA	Analysis	300.0		1	83764	11/19/11 10:07	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			83810	11/23/11 09:19	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		10	83913	11/23/11 15:06	RWE	TAL WFD
Total/NA	Analysis	300.0		10	84080	11/28/11 22:42	RWE	TAL WFD

## **Lab Chronicle**

Client: Olin Corporation

Project/Site: Olin Chemical Groundwater

Lab Sample ID: 360-37552-9

TestAmerica Job ID: 360-37552-1

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Matrix: Water

Client Sample ID: OC-PZ-25 Date Collected: 11/10/11 11:40

Date Received: 11/10/11 18:20

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B			83422	11/15/11 19:03	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83626	11/19/11 08:42	AMS	TAL WFD
Total/NA	Analysis	300.0		1	83765	11/19/11 12:32	RWE	TAL WFD
Total/NA	Analysis	300.0		10	83765	11/19/11 12:48	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			83810	11/23/11 09:19	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		10	83913	11/23/11 15:07	RWE	TAL WFD

#### Laboratory References:

TAL WFD = TestAmerica Westfield, Westfield Executive Park, 53 Southampton Road, Westfield, MA 01085, TEL (413)572-4000

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## **Certification Summary**

Client: Olin Corporation

Project/Site: Olin Chemical Groundwater

TestAmerica Job ID: 360-37552-1

Laboratory	Authority	Program	EPA Region	Certification ID
TestAmerica Westfield	Connecticut	State Program	1	PH-0494
TestAmerica Westfield	Maine	State Program	1	MA00014
TestAmerica Westfield	Massachusetts	State Program	1	M-MA014
TestAmerica Westfield	New Hampshire	NELAC	1	2539
TestAmerica Westfield	New York	NELAC	2	10843
TestAmerica Westfield	North Carolina	North Carolina DENR	4	647
TestAmerica Westfield	Rhode Island	State Program	1	LAO00057

Accreditation may not be offered or required for all methods and analytes reported in this package. Please contact your project manager for the laboratory's current list of certified methods and analytes.

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		State where P	rimary Accredita	ation is Carried
		New		
Method Name	Description	Hampshire (NELAC)	Mass	Conn
821-R-02-012	Toxicity, Acute (48-Hour)(list upon request)	NP	Wass	COIIII
SM 4500 CI F	Chlorine, Residual		NP	
SM 9215E	Heterotrophic Plate Count (SimPlate)		Р	
SM 9222D	Coliforms, Fecal (Membrane Filter)		P/NP	
SM 9223	Coliforms, Total, and E.Coli (Colilert-P/A)		Р	
SM 9224	Coliforms, Total, and E.Coli (Enumeration)		Р	
1103.1	E.coli		ambient/	
Enterolert	Enterococcus		source	
200.8 Rev 5.4	Metals (ICP/MS) (list upon request)	NP/P	NP/P	
200.7 Rev 4.4	Metals (ICP)(list upon request)	NP/P	NP/P	
6010B/C	Metals (ICP)(list upon request)	NP/SW		
245.1	Mercury (CVAA)	NP/P	NP	
7470A	Mercury (CVAA)	NP		
7471A	Mercury (CVAA)	SW		
SM 2340B	Total Hardness (as CaCO3) by calculation	NP/P	NP	
3005A	Preparation, Total Recoverable or Dissolved Metals	NP/P		
3010A	Preparation, Total Metals	NP/P NP/P/SW		ļ
3020A	Preparation, Total Metals	NP/P/SW SW		
3050B	Preparation, Metals	SW	P	
504.1 608	EDB, DBCP and 1,2,3-TCP (GC)	NP	NP	
625	Organochlorine Pest/PCBs (list upon request)	NP	NP	
3546	Semivolatile Org Comp (GC/MS)(list upon request)  Microwave Extraction	SW	INF	
3510C	Liquid-Liquid Extraction (Separatory Funnel)	NP		
3550B	Ultrasonic Extraction  Ultrasonic Extraction	SW		
8081AB	Organochlorine Pesticides (GC)(list upon request)	NP/SW		
8082/A	PCBs by Gas Chromatography(list upon request)	NP/SW		l 
8270C/D	Semivolatile Comp.(GC/MS)(list upon request)	NP/SW		
CT ETPH	Conn - Ext. Total petroleum Hydrocarbons (GC)	NP/SW		NP/SW
MA-EPH	Mass - Extractable Petroleum Hydrocarbons (GC)	NP/SW		
524.2	Volatile Org Comp (GC/MS)(list upon request)	Р	Р	
524.2	Trihalomethane compounds	Р	Р	
624	Volatile Org Comp (GC/MS)(list upon request)	NP	NP	
5035	Closed System Purge and Trap	SW		
5030B	Purge and Trap	NP		
8260B/C	Volatile Org Comp. (GC/MS)(list upon request)	NP/SW		
MAVPH	Mass - Volatile Petroleum Hydrocarbons (GC)			
180.1	Turbidity, Nephelometric	Р	Р	
300	Anions, Ion Chromatography	NP/P	NP/P	
410.4	COD	NP	NP	
1010	Ignitability, Pensky-Martens Closed-Cup Method	SW		
10-107-06-2	Nitrogen, Total Kjeldahl	NP	NP	
7196A	Chromium, Hexavalent	NP/SW NP/SW		
9012A	Cyanide, Total and/or Amenable	NP/SW		
9030B	Sulfide, Distillation (Acid Soluble and Insoluble)	SW		
9045C L107041C	pH Nitrogen Nitrate	NP	P	
L107-04-1C	Nitrogen, Nitrate Nitrogen Ammonia	NP	NP	<b> </b>
L204001A CN	Cyanide, Total	P	NP/P	
L210-001A	Phenolics, Total Recoverable	NP	NP	
SM 2320B	Alkalinity	NP/P	NP/P	
SM 2510B	Conductivity, Specific Conductance	NP/P	NP/P	
SM 2540C	Solids, Total Dissolved (TDS)	NP/P	NP/P	
SM 2540D	Solids, Total Suspended (TSS)	NP	NP	
SM 3500 CR D	Chromium, Hexavalent	NP		
SM 4500 H+ B	pH	NP/P	NP/P	
SM 4500 NO2 B	Nitrogen, Nitrite	NP	Р	
SM 4500 P E	Phosphorus, Orthophosphate	NP/P	NP	
SM 4500 P E	Phosphorus, Total	NP	NP	
SM 4500 S2 D	Sulfide, Total	NP		
SM 5210B	BOD, 5-Day	NP	NP	
SM 5310B	Organic Carbon, Total (TOC)	NP/P	NP	

Not all organic compounds are accreditied under NELAC

For methods with multiple compounds all compounds may not meet NELAC criteria, listing should be obtained from the laboratory The lab carries additional accreditations with several states. This is the laboratories typical listing but is subject to change based on the laboratories current certification standing.

# **Login Sample Receipt Checklist**

Client: Olin Corporation Job Number: 360-37552-1

Login Number: 37552 List Source: TestAmerica Westfield

List Number: 1

Creator: Ard, Vanessa L

Question	Answer Comment
Radioactivity either was not measured or, if measured, is at or below background	N/A
The cooler's custody seal, if present, is intact.	N/A
The cooler or samples do not appear to have been compromised or tampered with.	True
Samples were received on ice.	True
Cooler Temperature is acceptable.	True
Cooler Temperature is recorded.	True
COC is present.	True
COC is filled out in ink and legible.	True
COC is filled out with all pertinent information.	True
Is the Field Sampler's name present on COC?	True
There are no discrepancies between the sample IDs on the containers and the COC.	True
Samples are received within Holding Time.	True
Sample containers have legible labels.	True
Containers are not broken or leaking.	True
Sample collection date/times are provided.	True
Appropriate sample containers are used.	True
Sample bottles are completely filled.	True
Sample Preservation Verified.	True
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A
Multiphasic samples are not present.	True
Samples do not require splitting or compositing.	True
Residual Chlorine Checked.	N/A

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TAL-8245-360 0310

Westfield Executive Park 53 Southampton Road Westfield, MA 01085
Phone (413) 572-4000 Fax (413) 572-3707 TestAmerica Westfield

 $\mathcal{L}\mathcal{L}$  Chain of Custody Record

**TestAmerica** 

Phone (413) 572-4000 Fax (413) 572-3707											THE LEA	DER IN ENVI	THE LEADER IN ENVIRONMENTAL TESTING
Client Information	Sampler:	N 37.42	10	Lab PM:	Bost		P. S. S.	Carrier	Carrier Tracking No(s)	(s):	COC No:	C	
Client Contact: Tames Cashorell	Phone:			E-Mail:							Page:	- { }	
Core							Analysis	Requested	pa		Job #;		
Address: St Europe St	Due Date Requested;	4		: 12.5							Preserv	on Co	ies:
City:	TAT Requested (days):	(S):				N	( a)				B - NaOH		J - DI Walei M - Hexane
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Phone.	Quote #:			1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		15   4	17				F - MeOH		R - Na2S2SO3
Email:	PO #					24	1P'-J			***************************************	-	H - Ascorbic Acid S	Z - HZSO4 Z - other (specify)
Project Namelnumber: Olin Semicannul (AN Singling	WO #:				ૃઠ	9/s	′ <del>X</del> ·					RCP CTRS	GW1/S1
Sie: Olin Wilmington MA	SSOW#:				វែកាទខ	17	ادر						EDD Required
Pag	***************************************		Sample Type (C=comp,	Wwwater, S-solid, Owwate/oil, BT-Tissue,	ilini s'reiqm beredij ble MSM mroh	Chlori	HI 3:0				19dmuM lst		
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# **TestAmerica**

THE LEADER IN ENVIRONMENTAL TESTING

# ANALYTICAL REPORT

TestAmerica Laboratories, Inc. TestAmerica Westfield Westfield Executive Park 53 Southampton Road Westfield, MA 01085

Tel: (413)572-4000

TestAmerica Job ID: 360-37595-1 Client Project/Site: Olin Chemical

For: Olin Corporation **PO BOX 248** Charleston, Tennessee 37310-0248

Attn: Mr. James Cashwell

Rumold

Authorized for release by: 11/30/2011 3:39:38 PM Chris Reynolds

**QA** Manager

chris.reynolds@testamericainc.com

Designee for

Becky Mason

Project Manager II

becky.mason@testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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### **Case Narrative**

Client: Olin Corporation Project/Site: Olin Chemical TestAmerica Job ID: 360-37595-1

Job ID: 360-37595-1

**Laboratory: TestAmerica Westfield** 

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

TestAmerica's Reporting Limits (RLs) for this report may not always meet WSC-CAM-III method reporting limits due to various reasons such as methodology, dilutions or moisture content (soils). TestAmerica's MA pivot table EDD documents which compound(s) exceed certain regulatory standards. If not included with your deliverables, please contact your Project Manager about the availability of this EDD for your report.

### RECEIPT

The samples were received on 11/11/2011; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 6.0 C.

Note: All samples that require thermal preservation are considered acceptable if the arrival temperature is within the method's specified temperature range or for general analysis, ranging from 6°C to just above the freezing temperature of water. Samples that are hand delivered, immediately following collection, may not meet these criteria; however, they will be considered acceptable according to NELAC and State standards, if there is evidence that the chilling process has begun, such as stored and transported to the laboratory on ice.

Samples OC-SD-SD1-0.0/0.5 (360-37595-1), OC-SD-SD2-0.0/0.5 (360-37595-2), OC-SD-SD3-0.0/0.5 (360-37595-3), OC-SD-SD3 DUP-0.0/0.5 (360-37595-4), OC-SD-SD4-0.0/0.5 (360-37595-5) and OC-SD-SD5-0.0/0.5 (360-37595-6) were analyzed for total metals (ICP) in accordance with EPA SW-846 Method 6010B. The samples were prepared on 11/16/2011 and 11/21/2011 and analyzed on 11/18/2011 and 11/21/2011.

Aluminum and Iron were detected in method blank MB 360-83454/1-A at levels that were above the method detection limit but below the reporting limit. The values should be considered estimates, and have been flagged "J". If the associated sample reported a result above the MDL and/or RL, the result has been "B" flagged. Iron was detected in method blank MB 360-83671/1-A at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged "J". If the associated sample reported a result above the MDL and/or RL, the result has been "B" flagged. Refer to the QC report for details.

Aluminum and Iron failed the recovery criteria high for the MS of sample OC-SD-SD3-0.0/0.5MS (360-37595-3) in batch 360-83608.

Iron failed the recovery criteria low for the MSD of sample OC-SD-SD3-0.0/0.5MSD (360-37595-3) in batch 360-83608.

Iron failed the recovery criteria low for the MS of sample 360-37692-1 in batch 360-83721. Aluminum failed the recovery criteria high. The presence of the '4' qualifier in the report indicates analytes where the concentration in the unspiked sample exceeded four times the spiking amount. Refer to the QC report for details.

At the request of the client, an abbreviated/modified MCP analyte list was reported for this job.

No other difficulties were encountered during the metals analyses.

All other quality control parameters were within the acceptance limits.

### **PERCENT SOLIDS**

Samples OC-SD-SD1-0.0/0.5 (360-37595-1), OC-SD-SD2-0.0/0.5 (360-37595-2), OC-SD-SD3-0.0/0.5 (360-37595-3), OC-SD-SD3 DUP-0.0/0.5 (360-37595-4), OC-SD-SD4-0.0/0.5 (360-37595-5) and OC-SD-SD5-0.0/0.5 (360-37595-6) were analyzed for percent solids in accordance with EPA Moisture. The samples were analyzed on 11/14/2011.

### **Case Narrative**

Client: Olin Corporation Project/Site: Olin Chemical TestAmerica Job ID: 360-37595-1

### Job ID: 360-37595-1 (Continued)

**Laboratory: TestAmerica Westfield (Continued)** 

No difficulties were encountered during the % solids analyses.

All quality control parameters were within the acceptance limits.

This form provides certifications for the following data set: list Laboratory Sample ID Number(s):  360-37959-1 [1-8]  Matrices:	Proje	ct Location:	Wilming	gton MA	RTN:				
Matrices: Groundwater/Surface Water Soil/Sediment Drinking Water Air Other:  CAM Protocols (check all that apply below):  8260 VCC 74707471 Hg Mass DEP VPH 8081 Pesticides 7196 Hex Cr AM VI B CAM IX B CAM IX A CAM III B CAM IX B CAM V B CAM V B CAM IX B C	This fo	orm provide	s certifications for	the following data	set: list Laborato	ry Sample ID Number(s):			
CAM Protocols (check all that apply below):  8260 VOC	360-37	7595-1 [1-8]							
Mass DEP VPH   B081 Pesticides   7196 Hex Cr   CAM II B   CAM II A   CAM II B   CAM II A   CAM II B   CAM IV A   CAM V B   CAM V IB   CAM IV A   CAM IV B   CAM IV B   CAM IV A   CAM IV B   CAM IV	Matrice	es:	Groundwater/Surfa	ce Water X	Soil/Sediment	Drinking Water ☐Air	Ot	her:	
CAM II A			<u> </u>	· · · · · · · · · · · · · · · · · · ·					
Response to Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data?	8260 \	/OC	7470/7471 Hg	Mass DEP VPH	8081 Pesticides	7196 Hex Cr	Mass DEF	P API	┥
CAM II B			CAM III B	CAM IV A	CAM V B	CAM VI B			
Solition Metals	8270 S	SVOC	7010 Metals	Mass DEP EPH	8151 Herbicides	8330 Explosives	TO-15 VC	C	
Solition Metals	CAM I	IB 🗌	CAM III C	CAM IV B	CAM V C	CAM VIII A	CAM IX B	3	
Affirmative Responses to Questions A through F are required for "Presumptive Certainty" status  A Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding time.  B Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed?  C Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?  Does the laboratory report comply with all the reporting requirements specified in CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?  A VPH, EPH and APH Methods only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications). b. APH and TO-15 Methods only: Was the complete analyte list reported for each method? Yes Seponses to Questions A through E)?  Responses to Questions G, H and I below are required for "Presumptive Certainty" status  Were the reporting limits at or below all CAM reporting limits specified in the selected CAM Protocol(s) Pata User Note: Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WCS-07-350  H Were all QC performance standards specified in the CAM protocol(s) achieved? Yes All negative responses must be addressed in an attached laboratory narrative.  I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, is accurate and complete.  Signature: Christine Reynolds  Date: 11/30/11 15:32			6020 Metals	8082 PCB		332.0 Perchlorate			
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Were the reporting limits at or below all CAM reporting limits specified in the selected CAM    Yes									INU
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Data User Note: Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WCS-07-350  H Were all QC performance standards specified in the CAM protocol(s) achieved?  I Were results reported for the complete analyte list specified in the selected CAM protocol(s)?  All negative responses must be addressed in an attached laboratory narrative.  I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, is accurate and complete.  Signature:  Printed Name: Christine Reynolds  Date: 11/30/11 15:32	(3 )		oorting limits at or be	eiow all CAM reporti	ing limits specified in	i the selected CAM	X		No <sup>1</sup>
H Were all QC performance standards specified in the CAM protocol(s) achieved?  I Were results reported for the complete analyte list specified in the selected CAM protocol(s)?  All negative responses must be addressed in an attached laboratory narrative.  If the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, is accurate and complete.  Signature:  Printed Name:  Christine Reynolds  Date:  11/30/11 15:32		· · · · · ·	ata that achieve "Pro	esumptive Certainty	" status may not nec	essarily meet the data usabil	1		
Were results reported for the complete analyte list specified in the selected CAM protocol(s)?   Yes   X     All negative responses must be addressed in an attached laboratory narrative.   In the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, is accurate and complete.    Signature:									
All negative responses must be addressed in an attached laboratory narrative.  If, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, is accurate and complete.  Signature:  Position:  Quality Assurance Manager  Printed Name:  Christine Reynolds  Date:  11/30/11 15:32	Н	Were <b>all</b> QC	performance stand	ards specified in the	e CAM protocol(s) ac	chieved?	Yes	X	No
If the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, is accurate and complete.  Signature:  Printed Name:  Christine Reynolds  Date:  11/30/11 15:32	<u> </u>	Were results	reported for the cor	mplete analyte list s	pecified in the selec	ted CAM protocol(s) ?	Yes	X	No
Signature:  Christine Reynolds  Printed Name:  Christine Reynolds  Position:  Date:  11/30/11 15:32	All ne	egative respo	nses must be addre	essed in an attached	l laboratory narrative	e.			
Signature: Printed Name: Christine Reynolds Position: Quality Assurance Manager  Position: Quality Assurance Manager  11/30/11 15:32	l, the u	ındersigned, a	attest under the pain	s and penalties of p	erjury that, based up	on my personal inquiry of the	ose respon	sible	for
Signature: Printed Name: Christine Reynolds Position: Quality Assurance Manager  Printed Name: Date: 11/30/11 15:32	obtaini	ing the inforn	nation, the material c	contained in this ana	lytical report is, to th	e best of my knowledge and	belief,		
Printed Name: Christine Reynolds Date: 11/30/11 15:32	is accu	ırate and con	plete.						
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Printed Name: Christine Reynolds Date: 11/30/11 15:32	oignat	ui <del>C</del> .	Christme to	went Kunsk	<b>1</b> 2	Quality Assurant	e manage	1	
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**MassDEP Analytical Protocol Certification Form** 

**TestAmerica Westfield** 

Laboratory Name:

Project #:

360-37595-1

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Client: Olin Corporation Project/Site: Olin Chemical TestAmerica Job ID: 360-37595-1

Lab Sample ID: 360-37595-1

Lab Sample ID: 360-37595-2

Lab Sample ID: 360-37595-3

Lab Sample ID: 360-37595-4

Lab Sample ID: 360-37595-5

Lab Sample ID: 360-37595-6

<b>Client Sample</b>	ID: O	C-SD-SD	1-0.0/0.5
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Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	11000	В	13	1.8	mg/Kg		₩	6010B	Total/NA
Chromium	30		0.84	0.42	mg/Kg	1	₽	6010B	Total/NA
Iron	13000	В	30	1.6	mg/Kg	1	₩	6010B	Total/NA

### Client Sample ID: OC-SD-SD2-0.0/0.5

-	Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
P	Aluminum	11000	В	11	1.6	mg/Kg	1	₩	6010B	Total/NA
(	Chromium	130		0.72	0.36	mg/Kg	1	₩	6010B	Total/NA
L	Iron	14000	В	25	1.4	mg/Kg	1	₩	6010B	Total/NA

### Client Sample ID: OC-SD-SD3-0.0/0.5

	Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
7	Aluminum	9700	В	13	1.8	mg/Kg	1	#	6010B	Total/NA
(	Chromium	35		0.84	0.42	mg/Kg	1	₩	6010B	Total/NA
L	Iron	14000	В	29	1.6	mg/Kg	1	₩	6010B	Total/NA

### Client Sample ID: OC-SD-SD3 DUP-0.0/0.5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	9800		11	1.6	mg/Kg	1	₩	6010B	Total/NA
Chromium	45		0.73	0.37	mg/Kg	1	₽	6010B	Total/NA
Iron	14000	В	26	1.4	mg/Kg	1	₩	6010B	Total/NA

### Client Sample ID: OC-SD-SD4-0.0/0.5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	9900	В	14	2.1	mg/Kg		₩	6010B	Total/NA
Chromium	140		0.95	0.48	mg/Kg	1	₩	6010B	Total/NA
Iron	17000	В	33	1.8	mg/Kg	1	₩	6010B	Total/NA

### Client Sample ID: OC-SD-SD5-0.0/0.5

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	11000	11	1.7	mg/Kg	1	₩	6010B	Total/NA
Chromium	59	0.76	0.38	mg/Kg	1	₩	6010B	Total/NA
Iron	15000 B	27	1.4	mg/Kg	1	₽	6010B	Total/NA

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# **Method Summary**

Client: Olin Corporation Project/Site: Olin Chemical TestAmerica Job ID: 360-37595-1

Method	Method Description	Protocol	Laboratory
6010B	Metals (ICP)	SW846	TAL WFD
Moisture	Percent Moisture	EPA	TAL WFD

### Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

### Laboratory References:

TAL WFD = TestAmerica Westfield, Westfield Executive Park, 53 Southampton Road, Westfield, MA 01085, TEL (413)572-4000

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# **Sample Summary**

Client: Olin Corporation Project/Site: Olin Chemical TestAmerica Job ID: 360-37595-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
360-37595-1	OC-SD-SD1-0.0/0.5	Solid	11/11/11 12:35	11/11/11 17:25
360-37595-2	OC-SD-SD2-0.0/0.5	Solid	11/11/11 12:20	11/11/11 17:25
360-37595-3	OC-SD-SD3-0.0/0.5	Solid	11/11/11 12:10	11/11/11 17:25
360-37595-4	OC-SD-SD3 DUP-0.0/0.5	Solid	11/11/11 12:10	11/11/11 17:25
360-37595-5	OC-SD-SD4-0.0/0.5	Solid	11/11/11 12:00	11/11/11 17:25
360-37595-6	OC-SD-SD5-0.0/0.5	Solid	11/11/11 11:50	11/11/11 17:25

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Client: Olin Corporation TestAmerica Job ID: 360-37595-1 Project/Site: Olin Chemical

Method: 6010B - Metals (ICP)

Client Sample ID: OC-SD-SD1-0.0/0.5 Date Collected: 11/11/11 12:35

Lab Sample ID: 360-37595-1 **Matrix: Solid** Date Received: 11/11/11 17:25

Percent Solids: 71.5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	11000	В	13	1.8	mg/Kg	\$	11/16/11 12:50	11/18/11 12:26	1
Chromium	30		0.84	0.42	mg/Kg	₽	11/16/11 12:50	11/18/11 12:26	1
Iron	13000	В	30	1.6	mg/Kg	₽	11/16/11 12:50	11/18/11 12:26	1

Client Sample ID: OC-SD-SD2-0.0/0.5 Lab Sample ID: 360-37595-2 Date Collected: 11/11/11 12:20

**Matrix: Solid** 

Percent Solids: 75.0

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	11000	В	11	1.6	mg/Kg	₽	11/16/11 12:50	11/18/11 12:29	1
Chromium	130		0.72	0.36	mg/Kg	₽	11/16/11 12:50	11/18/11 12:29	1
Iron	14000	В	25	1.4	mg/Kg	₽	11/16/11 12:50	11/18/11 12:29	1

Client Sample ID: OC-SD-SD3-0.0/0.5 Lab Sample ID: 360-37595-3

Date Collected: 11/11/11 12:10

Date Received: 11/11/11 17:25

**Matrix: Solid** Date Received: 11/11/11 17:25 Percent Solids: 72.3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	9700	В	13	1.8	mg/Kg	*	11/16/11 12:50	11/18/11 12:11	1
Chromium	35		0.84	0.42	mg/Kg	₩	11/16/11 12:50	11/18/11 12:11	1
Iron	14000	В	29	1.6	mg/Kg	₩	11/16/11 12:50	11/18/11 12:11	1

Client Sample ID: OC-SD-SD3 DUP-0.0/0.5 Lab Sample ID: 360-37595-4

Date Collected: 11/11/11 12:10

**Matrix: Solid** Date Received: 11/11/11 17:25 Percent Solids: 74.2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	9800		11	1.6	mg/Kg	*	11/21/11 10:33	11/21/11 18:10	1
Chromium	45		0.73	0.37	mg/Kg	₽	11/21/11 10:33	11/21/11 18:10	1
Iron	14000	В	26	1.4	mg/Kg	₽	11/21/11 10:33	11/21/11 18:10	1

Client Sample ID: OC-SD-SD4-0.0/0.5 Lab Sample ID: 360-37595-5

Date Collected: 11/11/11 12:00 **Matrix: Solid** Date Received: 11/11/11 17:25 Percent Solids: 65.7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	9900	В	14	2.1	mg/Kg	*	11/16/11 12:50	11/18/11 12:32	1
Chromium	140		0.95	0.48	mg/Kg	₽	11/16/11 12:50	11/18/11 12:32	1
Iron	17000	В	33	1.8	mg/Kg	₽	11/16/11 12:50	11/18/11 12:32	1

Client Sample ID: OC-SD-SD5-0.0/0.5 Lab Sample ID: 360-37595-6

Date Collected: 11/11/11 11:50 **Matrix: Solid** Date Received: 11/11/11 17:25 Percent Solids: 73.3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	11000		11	1.7	mg/Kg	<del>\</del>	11/21/11 10:33	11/21/11 18:13	1
Chromium	59		0.76	0.38	mg/Kg	₩	11/21/11 10:33	11/21/11 18:13	1
Iron	15000	В	27	1.4	mg/Kg	₽	11/21/11 10:33	11/21/11 18:13	1

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Client: Olin Corporation TestAmerica Job ID: 360-37595-1
Project/Site: Olin Chemical

# **General Chemistry**

Client Sample ID: OC-SD-SD1-0.0/0.5

Date Collected: 11/11/11 12:35

Lab Sample ID: 360-37595-1

Matrix: Solid

Date Received: 11/11/11 17:25

Analyte	Result Qualifier	RL	RL Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	29	1.0	1.0 %			11/14/11 10:27	1
Percent Solids	71	1.0	1.0 %			11/14/11 10:27	1

Lab Sample ID: 360-37595-2

Matrix: Solid

**Matrix: Solid** 

**Matrix: Solid** 

Date Collected: 11/11/11 12:20 Date Received: 11/11/11 17:25

Client Sample ID: OC-SD-SD2-0.0/0.5

Analyte Result Qualifier RL RL Unit D Prepared Analyzed Dil Fac 1.0 1.0 % 11/14/11 10:27 **Percent Moisture** 25 11/14/11 10:27 **Percent Solids 75** 1.0 1.0

Client Sample ID: OC-SD-SD3-0.0/0.5 Lab Sample ID: 360-37595-3

Date Collected: 11/11/11 12:10 Matrix: Solid

Date Received: 11/11/11 17:25

Analyte Result Qualifier RL RL Unit D Analyzed Dil Fac Prepared 1.0 % 1.0 11/14/11 10:27 **Percent Moisture** 28 1.0 1.0 % 11/14/11 10:27 **Percent Solids 72** 

Client Sample ID: OC-SD-SD3 DUP-0.0/0.5 Lab Sample ID: 360-37595-4

Date Collected: 11/11/11 12:10

Date Received: 11/11/11 17:25

Analyte Result Qualifier RL **RL** Unit D Prepared Analyzed Dil Fac 1.0 1.0 % 11/14/11 10:27 **Percent Moisture** 26 % 11/14/11 10:27 **Percent Solids** 74 1.0 1.0

Client Sample ID: OC-SD-SD4-0.0/0.5

Date Collected: 11/11/11 12:00

Lab Sample ID: 360-37595-5

Matrix: Solid

Date Collected: 11/11/11 12:00 Date Received: 11/11/11 17:25

Result Qualifier RL **RL** Unit D Prepared Analyzed Dil Fac Analyte 1.0 1.0 % 11/14/11 10:27 **Percent Moisture** 34 1.0 1.0 % 11/14/11 10:27 **Percent Solids** 66

Client Sample ID: OC-SD-SD5-0.0/0.5 Lab Sample ID: 360-37595-6

Date Collected: 11/11/11 11:50

Date Received: 11/11/11 17:25

Analyte	Result Qualifier	RL	RL Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	27	1.0	1.0 %			11/14/11 10:27	1
Percent Solids	73	1.0	1.0 %			11/14/11 10:27	1

# **Definitions/Glossary**

Client: Olin Corporation Project/Site: Olin Chemical TestAmerica Job ID: 360-37595-1

### **Qualifiers**

### Metals

Qualifier	Qualifier Description
В	Compound was found in the blank and sample.
4	MS, MSD: The analyte present in the original sample is 4 times greater than the matrix spike concentration; therefore, control limits are not applicable.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

# Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
☼	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CNF	Contains no Free Liquid
DL, RA, RE, IN	Indicates a Dilution, Reanalysis, Re-extraction, or additional Initial metals/anion analysis of the sample
EDL	Estimated Detection Limit
EPA	United States Environmental Protection Agency
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
RL	Reporting Limit
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

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TestAmerica Job ID: 360-37595-1

Client: Olin Corporation Project/Site: Olin Chemical

### **Metals**

### Prep Batch: 83454

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37595-1	OC-SD-SD1-0.0/0.5	Total/NA	Solid	3050B	
360-37595-2	OC-SD-SD2-0.0/0.5	Total/NA	Solid	3050B	
360-37595-3	OC-SD-SD3-0.0/0.5	Total/NA	Solid	3050B	
360-37595-3 MS	OC-SD-SD3-0.0/0.5	Total/NA	Solid	3050B	
360-37595-3 MSD	OC-SD-SD3-0.0/0.5	Total/NA	Solid	3050B	
360-37595-5	OC-SD-SD4-0.0/0.5	Total/NA	Solid	3050B	
LCDSRM 360-83454/3-A LCDSF	Lab Control Sample Dup	Total/NA	Solid	3050B	
LCSSRM 360-83454/2-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 360-83454/1-A	Method Blank	Total/NA	Solid	3050B	

### **Analysis Batch: 83608**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37595-1	OC-SD-SD1-0.0/0.5	Total/NA	Solid	6010B	83454
360-37595-2	OC-SD-SD2-0.0/0.5	Total/NA	Solid	6010B	83454
360-37595-3	OC-SD-SD3-0.0/0.5	Total/NA	Solid	6010B	83454
360-37595-3 MS	OC-SD-SD3-0.0/0.5	Total/NA	Solid	6010B	83454
360-37595-3 MSD	OC-SD-SD3-0.0/0.5	Total/NA	Solid	6010B	83454
360-37595-5	OC-SD-SD4-0.0/0.5	Total/NA	Solid	6010B	83454
LCDSRM 360-83454/3-A LCDSF	Lab Control Sample Dup	Total/NA	Solid	6010B	83454
LCSSRM 360-83454/2-A	Lab Control Sample	Total/NA	Solid	6010B	83454
MB 360-83454/1-A	Method Blank	Total/NA	Solid	6010B	83454

### Prep Batch: 83671

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Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37595-4	OC-SD-SD3 DUP-0.0/0.5	Total/NA	Solid	3050B	
360-37595-6	OC-SD-SD5-0.0/0.5	Total/NA	Solid	3050B	
LCDSRM 360-83671/3-A LCDSF	Lab Control Sample Dup	Total/NA	Solid	3050B	
LCSSRM 360-83671/2-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 360-83671/1-A	Method Blank	Total/NA	Solid	3050B	

### Analysis Batch: 83721

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37595-4	OC-SD-SD3 DUP-0.0/0.5	Total/NA	Solid	6010B	83671
360-37595-6	OC-SD-SD5-0.0/0.5	Total/NA	Solid	6010B	83671
LCDSRM 360-83671/3-A LCDS	F Lab Control Sample Dup	Total/NA	Solid	6010B	83671
LCSSRM 360-83671/2-A	Lab Control Sample	Total/NA	Solid	6010B	83671
MB 360-83671/1-A	Method Blank	Total/NA	Solid	6010B	83671

## **General Chemistry**

### Analysis Batch: 83312

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37595-1	OC-SD-SD1-0.0/0.5	Total/NA	Solid	Moisture	
360-37595-2	OC-SD-SD2-0.0/0.5	Total/NA	Solid	Moisture	
360-37595-3	OC-SD-SD3-0.0/0.5	Total/NA	Solid	Moisture	
360-37595-3 MS	OC-SD-SD3-0.0/0.5	Total/NA	Solid	Moisture	
360-37595-3 MSD	OC-SD-SD3-0.0/0.5	Total/NA	Solid	Moisture	
360-37595-4	OC-SD-SD3 DUP-0.0/0.5	Total/NA	Solid	Moisture	
360-37595-5	OC-SD-SD4-0.0/0.5	Total/NA	Solid	Moisture	
360-37595-6	OC-SD-SD5-0.0/0.5	Total/NA	Solid	Moisture	

TestAmerica Westfield 11/30/2011

TestAmerica Job ID: 360-37595-1

Client: Olin Corporation Project/Site: Olin Chemical

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 360-83454/1-A

Lab Sample ID: LCDSRM 360-83454/3-A LCDSRM

**Matrix: Solid** 

**Matrix: Solid** 

**Analysis Batch: 83608** 

**Analysis Batch: 83608** 

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 83454

	IVID	IVID							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	6.36	J	7.5	1.1	mg/Kg		11/16/11 12:50	11/18/11 11:57	1
Chromium	ND		0.50	0.25	mg/Kg		11/16/11 12:50	11/18/11 11:57	1
Iron	16.0	J	18	0.94	mg/Kg		11/16/11 12:50	11/18/11 11:57	1

Client Sample ID: Lab Control Sample Dup Prep Type: Total/NA

Client Sample ID: OC-SD-SD3-0.0/0.5

Prep Batch: 83454 %Rec. RPD

Prep Batch: 83454

Spike LCDSRM LCDSRM Result Qualifier Analyte babbA Unit D %Rec Limits RPD Limit Aluminum 7740 13000 mg/Kg 169 89.9 - 279 30 Chromium 272 242 mg/Kg 89 68.0 - 124 30 0 Iron 13100 20400 mg/Kg 156 68.6 - 239

Lab Sample ID: LCSSRM 360-83454/2-A Client Sample ID: Lab Control Sample **Matrix: Solid** Prep Type: Total/NA

**Analysis Batch: 83608** 

Spike LCSSRM LCSSRM %Rec. Added Result Qualifier Unit D %Rec Limits 7740 13200 mg/Kg 170 89.9 - 279

Aluminum Chromium 272 243 mg/Kg 68.0 - 124 89 Iron 13100 20200 mg/Kg 154 68.6 - 239

Lab Sample ID: 360-37595-3 MS

**Matrix: Solid** 

Analyte

Prep Type: Total/NA **Analysis Batch: 83608** Prep Batch: 83454

	Sample	Sample	Spike	MS	MS				%Rec.	
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Aluminum	9700	В	417	10600	4	mg/Kg	₩	224	75 - 125	
Chromium	35		83.3	139		mg/Kg	≎	125	75 - 125	
Iron	14000	В	417	15900	4	mg/Kg	☼	494	75 - 125	

Lab Sample ID: 360-37595-3 MSD Client Sample ID: OC-SD-SD3-0.0/0.5

**Matrix: Solid** 

**Analysis Batch: 83608** 

Prep Batch: 83454 Sample Sample Spike MSD MSD %Rec. RPD Analyte Result Qualifier Added Result Qualifier Unit %Rec Limits RPD Limit Aluminum 9700 В 422 10000 35 mg/Kg 75 - 125 6 ₽ Chromium 84.3 75 - 125 35 130 mg/Kg 113 7 35 14000 B 422 13300 4 ₩ Iron mg/Kg -124 75 - 125

Lab Sample ID: MB 360-83671/1-A

**Matrix: Solid** 

**Analysis Batch: 83721** 

Client Sample ID: Method Blank Prep Type: Total/NA

Prep Batch: 83671

Prep Type: Total/NA

MR MR Analyte Result Qualifier RL MDL Unit Prepared Analyzed Dil Fac 7.5 Aluminum ND 11 mg/Kg 11/21/11 10:33 11/21/11 17:20 Chromium ND 0.50 0.25 mg/Kg 11/21/11 10:33 11/21/11 17:20 Iron 1.75 J 18 0.94 mg/Kg 11/21/11 10:33 11/21/11 17:20

## **QC Sample Results**

Client: Olin Corporation TestAmerica Job ID: 360-37595-1
Project/Site: Olin Chemical

Method: 6010B - Metals (ICP) (Continued)

Lab Sample ID: LCDSRM 360-83671/3-A LCDSRM

Matrix: Solid

Analysis Batch: 83721

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 83671

	Spike	LCDSRM	LCDSRM				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Aluminum	7740	17100		mg/Kg		221	89.9 - 279	12	30
Chromium	272	255		mg/Kg		94	68.0 - 124	5	30
Iron	13100	23000		mg/Kg		176	68.6 - 239	5	30

Lab Sample ID: LCSSRM 360-83671/2-A

Matrix: Solid

Analysis Batch: 83721

Spike

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Prep Batch: 83671

%Rec.

	Spike	LCSSRM	LCSSRM				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Aluminum	7740	15200		mg/Kg		197	89.9 - 279	
Chromium	272	267		mg/Kg		98	68.0 - 124	
Iron	13100	21900		mg/Kg		167	68.6 - 239	

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TestAmerica Job ID: 360-37595-1

Client: Olin Corporation Project/Site: Olin Chemical

Lab Sample ID: 360-37595-1

Matrix: Solid
Percent Solids: 71.5

Client Sample ID: OC-SD-SD1-0.0/0.5

Date Collected: 11/11/11 12:35 Date Received: 11/11/11 17:25

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			83454	11/16/11 12:50	OG	TAL WFD
Total/NA	Analysis	6010B		1	83608	11/18/11 12:26	TJS	TAL WFD
Total/NA	Analysis	Moisture		1	83312	11/14/11 10:27	OG	TAL WFD

Client Sample ID: OC-SD-SD2-0.0/0.5

Date Collected: 11/11/11 12:20

Lab Sample ID: 360-37595-2

Matrix: Solid

Date Received: 11/11/11 17:25 Percent Solids: 75.0

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			83454	11/16/11 12:50	OG	TAL WFD
Total/NA	Analysis	6010B		1	83608	11/18/11 12:29	TJS	TAL WFD
Total/NA	Analysis	Moisture		1	83312	11/14/11 10:27	OG	TAL WFD

Client Sample ID: OC-SD-SD3-0.0/0.5 Lab Sample ID: 360-37595-3

Date Collected: 11/11/11 12:10

Matrix: Solid
Page Page 1/4/14/14 17:25

Date Received: 11/11/11 17:25

Percent Solids: 72.3

Ratch Batch Batch Prepared

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			83454	11/16/11 12:50	OG	TAL WFD
Total/NA	Analysis	6010B		1	83608	11/18/11 12:11	TJS	TAL WFD
Total/NA	Analysis	Moisture		1	83312	11/14/11 10:27	OG	TAL WFD

Client Sample ID: OC-SD-SD3 DUP-0.0/0.5 Lab Sample ID: 360-37595-4

 Date Collected: 11/11/11 12:10
 Matrix: Solid

 Date Received: 11/11/11 17:25
 Percent Solids: 74.2

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			83671	11/21/11 10:33	EMN	TAL WFD
Total/NA	Analysis	6010B		1	83721	11/21/11 18:10	TJS	TAL WFD
Total/NA	Analysis	Moisture		1	83312	11/14/11 10:27	OG	TAL WFD

Client Sample ID: OC-SD-SD4-0.0/0.5 Lab Sample ID: 360-37595-5

 Date Collected: 11/11/11 12:00
 Matrix: Solid

 Date Received: 11/11/11 17:25
 Percent Solids: 65.7

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			83454	11/16/11 12:50	OG	TAL WFD
Total/NA	Analysis	6010B		1	83608	11/18/11 12:32	TJS	TAL WFD
Total/NA	Analysis	Moisture		1	83312	11/14/11 10:27	OG	TAL WFD

### **Lab Chronicle**

Client: Olin Corporation Project/Site: Olin Chemical

Date Collected: 11/11/11 11:50

Date Received: 11/11/11 17:25

Client Sample ID: OC-SD-SD5-0.0/0.5

TestAmerica Job ID: 360-37595-1

Lab Sample ID: 360-37595-6

Matrix: Solid

Percent Solids: 73.3

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			83671	11/21/11 10:33	EMN	TAL WFD
Total/NA	Analysis	6010B		1	83721	11/21/11 18:13	TJS	TAL WFD
Total/NA	Analysis	Moisture		1	83312	11/14/11 10:27	OG	TAL WFD

### Laboratory References:

TAL WFD = TestAmerica Westfield, Westfield Executive Park, 53 Southampton Road, Westfield, MA 01085, TEL (413)572-4000

# **Certification Summary**

Client: Olin Corporation Project/Site: Olin Chemical TestAmerica Job ID: 360-37595-1

Laboratory	Authority	Program	EPA Region	Certification ID
TestAmerica Westfield	Connecticut	State Program	1	PH-0494
TestAmerica Westfield	Maine	State Program	1	MA00014
TestAmerica Westfield	Massachusetts	State Program	1	M-MA014
TestAmerica Westfield	New Hampshire	NELAC	1	2539
TestAmerica Westfield	New York	NELAC	2	10843
TestAmerica Westfield	North Carolina	North Carolina DENR	4	647
TestAmerica Westfield	Rhode Island	State Program	1	LAO00057

Accreditation may not be offered or required for all methods and analytes reported in this package. Please contact your project manager for the laboratory's current list of certified methods and analytes.

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			rimary Accredit	ation is Carried
Method Name	Description	New Hampshire (NELAC)	Mass	Conn
821-R-02-012	Toxicity, Acute (48-Hour)(list upon request)	NP NP		
SM 4500 CI F	Chlorine, Residual		NP	
SM 9215E	Heterotrophic Plate Count (SimPlate)		Р	
SM 9222D	Coliforms, Fecal (Membrane Filter)		P/NP	
SM 9223	Coliforms, Total, and E.Coli (Colilert-P/A)		Р	
SM 9224	Coliforms, Total, and E.Coli (Enumeration)		Р	
1103.1	E.coli		ambient/	
Enterolert	Enterococcus		source	
200.8 Rev 5.4	Metals (ICP/MS) (list upon request)	NP/P	NP/P	
200.7 Rev 4.4	Metals (ICP)(list upon request)	NP/P	NP/P	
6010B/C	Metals (ICP)(list upon request)	NP/SW		
245.1	Mercury (CVAA)	NP/P	NP	
7470A	Mercury (CVAA)	NP		
7471A	Mercury (CVAA)	SW		
SM 2340B	Total Hardness (as CaCO3) by calculation	NP/P	NP	
3005A	Preparation, Total Recoverable or Dissolved Metals	NP/P		
3010A	Preparation, Total Metals	NP/P		
3020A	Preparation, Total Metals	NP/P/SW		
3050B	Preparation, Metals	SW		
504.1	EDB, DBCP and 1,2,3-TCP (GC)	P	Р	
608	Organochlorine Pest/PCBs (list upon request)	NP	NP	
625	Semivolatile Org Comp (GC/MS)(list upon request)	NP	NP	
3546	Microwave Extraction	SW		
3510C	Liquid-Liquid Extraction (Separatory Funnel)	NP NP		
3550B	Ultrasonic Extraction	SW		
8081AB	Organochlorine Pesticides (GC)(list upon request)	NP/SW		
8082/A	PCBs by Gas Chromatography(list upon request)	NP/SW		
8270C/D		NP/SW		
	Semivolatile Comp.(GC/MS)(list upon request)	NP/SW		NP/SW
CT ETPH MA-EPH	Conn - Ext. Total petroleum Hydrocarbons (GC)	NP/SW		INF/GVV
	Mass - Extractable Petroleum Hydrocarbons (GC)	P	Р	
524.2	Volatile Org Comp (GC/MS)(list upon request)	P	P	
524.2 624	Trihalomethane compounds	NP	NP	
5035	Volatile Org Comp (GC/MS)(list upon request)	SW	INF	
5030B	Closed System Purge and Trap	NP		
	Purge and Trap	NP/SW		
8260B/C MAVPH	Volatile Org Comp. (GC/MS)(list upon request)	INF/SVV		
	Mass - Volatile Petroleum Hydrocarbons (GC)	P	Р	
180.1	Turbidity, Nephelometric	NP/P	NP/P	
300	Anions, Ion Chromatography	NP/P	NP/P NP	
410.4	COD	SW	INP	
1010	Ignitability, Pensky-Martens Closed-Cup Method	NP Svv	NP	
10-107-06-2	Nitrogen, Total Kjeldahl	NP/SW	INP	
7196A	Chromium, Hexavalent	NP/SW		
9012A	Cyanide, Total and/or Amenable			
9030B	Sulfide, Distillation (Acid Soluble and Insoluble)	NP SW		
9045C	pH	SW	Р	
L107041C	Nitrogen, Nitrate	NP ND	P	
L107-06-1B	Nitrogen Ammonia	NP D	NP ND/D	
L204001A CN	Cyanide, Total	P	NP/P	
L210-001A	Phenolics, Total Recoverable	NP ND/D	NP ND/D	
SM 2320B	Alkalinity	NP/P	NP/P	
SM 2510B	Conductivity, Specific Conductance	NP/P	NP/P	
SM 2540C	Solids, Total Dissolved (TDS)	NP/P	NP/P	
SM 2540D	Solids, Total Suspended (TSS)	NP ND	NP	
SM 3500 CR D	Chromium, Hexavalent	NP ND/D	ND/D	
SM 4500 H+ B	pH	NP/P	NP/P	
SM 4500 NO2 B	Nitrogen, Nitrite	NP	P	
SM 4500 P E	Phosphorus, Orthophosphate	NP/P	NP	
SM 4500 P E	Phosphorus, Total	NP	NP	
SM 4500 S2 D	Sulfide, Total	NP		
SM 5210B	BOD, 5-Day	NP	NP	
SM 5310B	Organic Carbon, Total (TOC)	NP/P	NP	

Not all organic compounds are accreditied under NELAC

For methods with multiple compounds all compounds may not meet NELAC criteria, listing should be obtained from the laboratory The lab carries additional accreditations with several states. This is the laboratories typical listing but is subject to change based on the laboratories current certification standing.

# **Login Sample Receipt Checklist**

Client: Olin Corporation Job Number: 360-37595-1

Login Number: 37595 List Source: TestAmerica Westfield

List Number: 1

Creator: Ard, Vanessa L

oroaton / maj vanosoa E	
Question	Answer Comment
Radioactivity either was not measured or, if measured, is at or below background	N/A
The cooler's custody seal, if present, is intact.	N/A
The cooler or samples do not appear to have been compromised or tampered with.	True
Samples were received on ice.	True
Cooler Temperature is acceptable.	True
Cooler Temperature is recorded.	True
COC is present.	True
COC is filled out in ink and legible.	True
COC is filled out with all pertinent information.	True
Is the Field Sampler's name present on COC?	True
There are no discrepancies between the sample IDs on the containers and the COC.	True
Samples are received within Holding Time.	True
Sample containers have legible labels.	True
Containers are not broken or leaking.	True
Sample collection date/times are provided.	True
Appropriate sample containers are used.	True
Sample bottles are completely filled.	True
Sample Preservation Verified.	True
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A
Multiphasic samples are not present.	True
Samples do not require splitting or compositing.	True
Residual Chlorine Checked.	N/A

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Months

Сопралу B 12 12 11 Cooler Temperature(s) C and Other Remarks: Received Company Company 88 Date/Firne/ //--// '-/ Date/Time: Custody Seals Intact: Custody Seal No.:

TAL-8245-360 0310

THE LEADER IN ENVIRONMENTAL TESTING H - Ascorbic Acid S - H2SO4 1 - Ice Z - other (specity) Special Instructions/Note: Sample Disposal ( A fee may be assessed if samples are retained Tonger-tifah Linguith).

Special Figure Disposal By Lab Regulatory programs: reservation Codes C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH A - HCL B - NaOH RCP DEP Form Total Mumber of containers Analysis Requested Special Instructions/QC Requirements: Magos 1 2 20109 149 2 Lab PM Belky 7 S 2 2 2 Perform MS/MSD? 2 250 7 SeldmaS bereilit blei Ś 3 statitini e'retqms2 Company (W=water, S=solid, O=waste/oil, BT=Tissue, A-AIT Preservation Code: Radiological Marzolini G=grab) Sample Type C=comp, Unknown Sample Time 320 270 007 1225 1210 2 5 212 ざち TAT Requested (days): Due Date Requested: Sample Date Poison B 26 36 638 100 1 1 1 1 SSOW#: Sampler Quote #: Phone: # 0M # O MS -0.0/0.5 MSD -0.0/0. 2010-0-105 10.0/0 Skin Imtant 2.010.0 - 504-0.010. 50100-205 11.11 Deliverable Requested: I, II, III, IV, Other (specify) 10.01 Westfield, MA 01085 Phone (413) 572-4000 Fax (413) 572-3707 0188 \$000 \$000 5.65 0C- SD- CD3 2 Fiammable Possible Hazard Identification Tames 195 200 0 OC - SD S Client Information Sample Identification 3 Project Name/number. ~ 70 AN 500 AC-Non-Hazard elinquishee by. Client Contact: Refinduished State, Zip: Company: Address Phone:

CT RSR EDD Required

GW1/S1

N - None P - Na2O4S Q - Na2SO3 R - Na2S2SO3

J - Di Water M - Hexane

**TestAmerico** 

Chain of Custody Record

S E S

Westfield Executive Park 53 Southampton Road

**TestAmerica Westfield** 



# FILE COPY

# **TestAmerica**

THE LEADER IN ENVIRONMENTAL TESTING

# ANALYTICAL REPORT

TestAmerica Laboratories, Inc. TestAmerica Westfield Westfield Executive Park 53 Southampton Road Westfield, MA 01085 Tel: (413)572-4000

TestAmerica Job ID: 360-37596-1 Client Project/Site: Olin Chemical

For: Olin Corporation **PO BOX 248** Charleston, Tennessee 37310-0248

Attn: Mr. James Cashwell

Rumold

Authorized for release by: 12/2/2011 2:40:31 PM

Chris Reynolds

**QA** Manager

chris.reynolds@testamericainc.com

Designee for

Becky Mason

Project Manager II

becky.mason@testamericainc.com

**CHECKED FOR COMPLETENESS** OF PARAMETERS ORDERED BY:

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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### **Case Narrative**

Client: Olin Corporation Project/Site: Olin Chemical TestAmerica Job ID: 360-37596-1

Job ID: 360-37596-1

Laboratory: TestAmerica Westfield

### Narrative

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

### **RECEIPT**

The samples were received on 11/11/2011; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 6.0 C.

Note: All samples that require thermal preservation are considered acceptable if the arrival temperature is within the method's specified temperature range or for general analysis, ranging from 6°C to just above the freezing temperature of water. Samples that are hand delivered, immediately following collection, may not meet these criteria; however, they will be considered acceptable according to NELAC and State standards, if there is evidence that the chilling process has begun, such as stored and transported to the laboratory on ice.

### **DISSOLVED METALS**

Samples OC-GW-26 (360-37596-1), OC-GW-10s (360-37596-2), OC-GW-76s (360-37596-3), OC-GW-24 (360-37596-4) and OC-GW-25 (360-37596-5) were analyzed for dissolved metals in accordance with EPA SW-846 Method 6010B. The samples were analyzed on 11/23/2011.

At the request of the client, an abbreviated/modified MCP analyte list was reported for this job.

No difficulties were encountered during the dissolved metals analyses.

All quality control parameters were within the acceptance limits.

### SPECIFIC CONDUCTIVITY

Samples OC-GW-26 (360-37596-1), OC-GW-10s (360-37596-2), OC-GW-76s (360-37596-3), OC-GW-24 (360-37596-4) and OC-GW-25 (360-37596-5) were analyzed for specific conductivity in accordance with SM20 2510B. The samples were analyzed on 11/19/2011.

At the request of the client, an abbreviated/modified MCP analyte list was reported for this job.

No difficulties were encountered during the conductivity analyses.

All quality control parameters were within the acceptance limits.

### **ANIONS (28 DAY HOLD TIME)**

Samples OC-GW-26 (360-37596-1), OC-GW-10s (360-37596-2), OC-GW-76s (360-37596-3), OC-GW-24 (360-37596-4) and OC-GW-25 (360-37596-5) were analyzed for anions (28 day hold time) in accordance with EPA Method 300.0. The samples were analyzed on 11/21/2011.

Samples OC-GW-26 (360-37596-1)[10X] and OC-GW-25 (360-37596-5)[10X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No difficulties were encountered during the anions analyses.

All quality control parameters were within the acceptance limits.

### **AMMONIA**

Samples OC-GW-26 (360-37596-1), OC-GW-10s (360-37596-2), OC-GW-76s (360-37596-3), OC-GW-24 (360-37596-4) and OC-GW-25

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TestAmerica Westfield 12/2/2011

### **Case Narrative**

Client: Olin Corporation Project/Site: Olin Chemical

TestAmerica Job ID: 360-37596-1

Job ID: 360-37596-1 (Continued)

### **Laboratory: TestAmerica Westfield (Continued)**

(360-37596-5) were analyzed for ammonia in accordance with Lachat 107-06-1B. The samples were prepared and analyzed on 11/23/2011 and 11/30/2011.

Samples OC-GW-26 (360-37596-1)[10X], OC-GW-24 (360-37596-4)[4X] and OC-GW-25 (360-37596-5)[4X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No other difficulties were encountered during the ammonia analyses.

All other quality control parameters were within the acceptance limits.

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Client: Olin Corporation Project/Site: Olin Chemical TestAmerica Job ID: 360-37596-1

Client Sample ID: OC-GW-26

Lab Sample ID: 360-37596-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	6.1		5.0	0.65	ug/L	1	_	6010B	Dissolved
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	32		2.0	2.0	mg/L	1	_	300.0	Total/NA
Chloride	330		10	10	mg/L	10		300.0	Total/NA
Ammonia	47		1.0	1.0	mg/L	10		L107-06-1B	Total/NA
Specific Conductance	1200		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

Client Sample ID: OC-GW-10s

Lab Sample ID: 360-37596-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	3600		100	13	ug/L	1	_	6010B	Dissolved
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	69		2.0	2.0	mg/L	1	_	300.0	Total/NA
Chloride	20		1.0	1.0	mg/L	1		300.0	Total/NA
Ammonia	4.0		0.10	0.10	mg/L	1		L107-06-1B	Total/NA
Specific Conductance	220		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

Client Sample ID: OC-GW-76s

Lab Sample ID: 360-37596-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	2.3	J	5.0	0.65	ug/L	1	_	6010B	Dissolved
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	38		2.0	2.0	mg/L	1	_	300.0	Total/NA
Chloride	4.3		1.0	1.0	mg/L	1		300.0	Total/NA
Ammonia	6.7		0.10	0.10	mg/L	1		L107-06-1B	Total/NA
Specific Conductance	150		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

Client Sample ID: OC-GW-24

Lab Sample ID: 360-37596-4

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	53		2.0	2.0	mg/L	1	_	300.0	Total/NA
Chloride	13		1.0	1.0	mg/L	1		300.0	Total/NA
Ammonia	36		0.40	0.40	mg/L	4		L107-06-1B	Total/NA
Specific Conductance	340		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

**Client Sample ID: OC-GW-25** 

Lab Sample ID: 360-37596-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	2.4	J	5.0	0.65	ug/L	1	_	6010B	Dissolved
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	96		20	20	mg/L	10	_	300.0	Total/NA
Chloride	110		10	10	mg/L	10		300.0	Total/NA
Ammonia	36		0.40	0.40	mg/L	4		L107-06-1B	Total/NA
Specific Conductance	770		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

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# **Method Summary**

Client: Olin Corporation Project/Site: Olin Chemical

TestAmerica Job ID: 360-37596-1

Method	Method Description	Protocol	Laboratory
6010B	Dissolved Metals	SW846	TAL WFD
300.0	Chloride & Sulfate	40CFR136A	TAL WFD
L107-06-1B	Nitrogen Ammonia	LACHAT	TAL WFD
SM 2510B	Conductivity, Specific Conductance	SM	TAL WFD

### Protocol References:

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.

LACHAT = LACHAT

SM = "Standard Methods For The Examination Of Water And Wastewater",

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

### Laboratory References:

TAL WFD = TestAmerica Westfield, Westfield Executive Park, 53 Southampton Road, Westfield, MA 01085, TEL (413)572-4000

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# **Sample Summary**

Client: Olin Corporation Project/Site: Olin Chemical TestAmerica Job ID: 360-37596-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
360-37596-1	OC-GW-26	Water	11/11/11 09:35	11/11/11 17:25
360-37596-2	OC-GW-10s	Water	11/11/11 10:20	11/11/11 17:25
360-37596-3	OC-GW-76s	Water	11/11/11 11:25	11/11/11 17:25
360-37596-4	OC-GW-24	Water	11/11/11 09:35	11/11/11 17:25
360-37596-5	OC-GW-25	Water	11/11/11 08:35	11/11/11 17:25

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Client: Olin Corporation TestAmerica Job ID: 360-37596-1 Project/Site: Olin Chemical

### Method: 6010B - Dissolved Metals - Dissolved

Client Sample ID: OC-GW-26 Lab Sample ID: 360-37596-1 Date Collected: 11/11/11 09:35

**Matrix: Water** 

Date Received: 11/11/11 17:25

Analyte	Result Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND	100	13	ug/L			11/23/11 14:22	1
Chromium	6.1	5.0	0.65	ug/L			11/23/11 14:22	1

Client Sample ID: OC-GW-10s Lab Sample ID: 360-37596-2

Date Collected: 11/11/11 10:20 **Matrix: Water** 

Date Received: 11/11/11 17:25

Analyte Result Qualifier RL MDL Unit D Prepared Analyzed Dil Fac 100 13 ug/L 11/23/11 14:34 Aluminum 3600 Chromium ND 11/23/11 14:34 5.0 0.65 ug/L

Client Sample ID: OC-GW-76s Lab Sample ID: 360-37596-3

Date Collected: 11/11/11 11:25 **Matrix: Water** 

Date Received: 11/11/11 17:25

Analyte Result Qualifier RL MDL Unit D Dil Fac Prepared Analyzed 100 ND Aluminum 13 ug/L 11/23/11 14:37 5.0 0.65 11/23/11 14:37 Chromium 2.3 J ug/L

Client Sample ID: OC-GW-24 Lab Sample ID: 360-37596-4

Date Collected: 11/11/11 09:35 **Matrix: Water** 

Date Received: 11/11/11 17:25

Analyte Result Qualifier RL MDL Unit D Prepared Analyzed Dil Fac Aluminum ND 100 13 ug/L 11/23/11 14:40 Chromium ND 5.0 0.65 ug/L 11/23/11 14:40

Client Sample ID: OC-GW-25 Lab Sample ID: 360-37596-5 **Matrix: Water** 

Date Collected: 11/11/11 08:35 Date Received: 11/11/11 17:25

Chromium

Analyte Result Qualifier RL MDL Unit D Prepared Dil Fac Analyzed 100 ND Aluminum 13 ug/L 11/23/11 14:43

5.0

0.65 ug/L

2.4 J

TestAmerica Westfield 12/2/2011

11/23/11 14:43

Client: Olin Corporation Project/Site: Olin Chemical TestAmerica Job ID: 360-37596-1

### **General Chemistry**

Client Sample ID: OC-GW-26 Lab Sample ID: 360-37596-1 Date Collected: 11/11/11 09:35 **Matrix: Water** 

Date Received: 11/11/11 17:25

Analyte	Result Qualifier	RL	RL Unit	D Prepared	Analyzed	Dil Fac
Sulfate	32	2.0	2.0 mg/L	_ <u> </u>	11/21/11 19:58	1
Chloride	330	10	10 mg/L		11/21/11 20:14	10
Ammonia	47	1.0	1.0 mg/L	11/23/11 09:19	11/23/11 15:08	10
Specific Conductance	1200	1.0	1.0 umhos/cm		11/19/11 08:45	1

Client Sample ID: OC-GW-10s Lab Sample ID: 360-37596-2

Date Collected: 11/11/11 10:20 Date Received: 11/11/11 17:25

Dil Fac Analyte Result Qualifier RL RL Unit Prepared Analyzed Sulfate 69 2.0 2.0 mg/L 11/21/11 21:35 1.0 1.0 mg/L 11/21/11 21:35 Chloride 20 **Ammonia** 4.0 0.10 0.10 mg/L 11/30/11 10:45 11/30/11 16:26 11/19/11 08:46 1.0 1.0 umhos/cm **Specific Conductance** 220

Client Sample ID: OC-GW-76s Lab Sample ID: 360-37596-3

Date Collected: 11/11/11 11:25

Date Received: 11/11/11 17:25

Analyte	Result Qualifier	RL	RL Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	38	2.0	2.0 mg/L			11/21/11 22:07	1
Chloride	4.3	1.0	1.0 mg/L			11/21/11 22:07	1
Ammonia	6.7	0.10	0.10 mg/L		11/30/11 10:45	11/30/11 16:27	1
Specific Conductance	150	1.0	1.0 umhos/cm			11/19/11 08:48	1

Lab Sample ID: 360-37596-4 Client Sample ID: OC-GW-24 Date Collected: 11/11/11 09:35 **Matrix: Water** 

Date Received: 11/11/11 17:25

Analyte	Result Qualifier	RL	RL Unit	D Prepared	Analyzed	Dil Fac
Sulfate	53	2.0	2.0 mg/L		11/21/11 22:39	1
Chloride	13	1.0	1.0 mg/L		11/21/11 22:39	1
Ammonia	36	0.40	0.40 mg/L	11/30/11 10:45	11/30/11 16:52	4
Specific Conductance	340	1.0	1.0 umhos/cm		11/19/11 08:49	1

Client Sample ID: OC-GW-25 Lab Sample ID: 360-37596-5 Date Collected: 11/11/11 08:35 **Matrix: Water** 

Date Received: 11/11/11 17:25

Analyte	Resul	Qualifier RL	. RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	96	20	20	mg/L	_		11/21/11 20:46	10
Chloride	110	10	10	mg/L			11/21/11 20:46	10
Ammonia	36	0.40	0.40	mg/L		11/30/11 10:45	11/30/11 16:53	4
Specific Cond	uctance 770	1.0	1.0	umhos/cm			11/19/11 08:51	1

**Matrix: Water** 

**Matrix: Water** 

# **Definitions/Glossary**

Client: Olin Corporation Project/Site: Olin Chemical TestAmerica Job ID: 360-37596-1

### **Qualifiers**

### Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

# Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
<b>\tilde{\</b>	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CNF	Contains no Free Liquid
DL, RA, RE, IN	Indicates a Dilution, Reanalysis, Re-extraction, or additional Initial metals/anion analysis of the sample
EDL	Estimated Detection Limit
EPA	United States Environmental Protection Agency
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
RL	Reporting Limit
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

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# **QC Association Summary**

Client: Olin Corporation Project/Site: Olin Chemical TestAmerica Job ID: 360-37596-1

**Metals** 

Analysis Batch: 83882

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37596-1	OC-GW-26	Dissolved	Water	6010B	
360-37596-1 DU	OC-GW-26	Dissolved	Water	6010B	
360-37596-1 MS	OC-GW-26	Dissolved	Water	6010B	
360-37596-2	OC-GW-10s	Dissolved	Water	6010B	
360-37596-3	OC-GW-76s	Dissolved	Water	6010B	
360-37596-4	OC-GW-24	Dissolved	Water	6010B	
360-37596-5	OC-GW-25	Dissolved	Water	6010B	
LCS 360-83882/1	Lab Control Sample	Total/NA	Water	6010B	
LCSD 360-83882/13	Lab Control Sample Dup	Total/NA	Water	6010B	
MB 360-83882/2	Method Blank	Total/NA	Water	6010B	

### **General Chemistry**

### Analysis Batch: 83626

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37596-1	OC-GW-26	Total/NA	Water	SM 2510B	
360-37596-2	OC-GW-10s	Total/NA	Water	SM 2510B	
360-37596-3	OC-GW-76s	Total/NA	Water	SM 2510B	
360-37596-4	OC-GW-24	Total/NA	Water	SM 2510B	
360-37596-5	OC-GW-25	Total/NA	Water	SM 2510B	
LCS 360-83626/1	Lab Control Sample	Total/NA	Water	SM 2510B	
MB 360-83626/3	Method Blank	Total/NA	Water	SM 2510B	

### Prep Batch: 83810

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37596-1	OC-GW-26	Total/NA	Water	Distill/Ammonia	
LCS 360-83810/2-A	Lab Control Sample	Total/NA	Water	Distill/Ammonia	
MB 360-83810/1-A	Method Blank	Total/NA	Water	Distill/Ammonia	

### Analysis Batch: 83913

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37596-1	OC-GW-26	Total/NA	Water	L107-06-1B	83810
LCS 360-83810/2-A	Lab Control Sample	Total/NA	Water	L107-06-1B	83810
MB 360-83810/1-A	Method Blank	Total/NA	Water	L107-06-1B	83810

### Prep Batch: 84076

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37596-2	OC-GW-10s	Total/NA	Water	Distill/Ammonia	
360-37596-3	OC-GW-76s	Total/NA	Water	Distill/Ammonia	
360-37596-4	OC-GW-24	Total/NA	Water	Distill/Ammonia	
360-37596-5	OC-GW-25	Total/NA	Water	Distill/Ammonia	
LCS 360-84076/2-A	Lab Control Sample	Total/NA	Water	Distill/Ammonia	
MB 360-84076/1-A	Method Blank	Total/NA	Water	Distill/Ammonia	

### Analysis Batch: 84104

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37596-1	OC-GW-26	Total/NA	Water	300.0	
360-37596-1	OC-GW-26	Total/NA	Water	300.0	
360-37596-2	OC-GW-10s	Total/NA	Water	300.0	
360-37596-3	OC-GW-76s	Total/NA	Water	300.0	
360-37596-4	OC-GW-24	Total/NA	Water	300.0	
360-37596-5	OC-GW-25	Total/NA	Water	300.0	

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# **QC Association Summary**

Client: Olin Corporation Project/Site: Olin Chemical TestAmerica Job ID: 360-37596-1

# **General Chemistry (Continued)**

### **Analysis Batch: 84104 (Continued)**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 360-84104/4	Lab Control Sample	Total/NA	Water	300.0	
MB 360-84104/3	Method Blank	Total/NA	Water	300.0	

### Analysis Batch: 84183

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37596-2	OC-GW-10s	Total/NA	Water	L107-06-1B	84076
360-37596-3	OC-GW-76s	Total/NA	Water	L107-06-1B	84076
360-37596-4	OC-GW-24	Total/NA	Water	L107-06-1B	84076
360-37596-5	OC-GW-25	Total/NA	Water	L107-06-1B	84076
LCS 360-84076/2-A	Lab Control Sample	Total/NA	Water	L107-06-1B	84076
MB 360-84076/1-A	Method Blank	Total/NA	Water	L107-06-1B	84076

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TestAmerica Job ID: 360-37596-1

Client: Olin Corporation Project/Site: Olin Chemical

Method: 6010B - Dissolved Metals

Lab Sample ID: MB 360-83882/2

**Matrix: Water** 

**Analysis Batch: 83882** 

Client Sample ID: Method Bla	ınk
Prep Type: Total/	NA

мв мв Result Qualifier RL MDL Unit D Dil Fac Analyte Prepared Analyzed Aluminum 100 13 ug/L ND 11/23/11 14:19 Chromium ND 5.0 11/23/11 14:19 0.65 ug/L

Lab Sample ID: LCS 360-83882/1 Client Sample ID: Lab Control Sample Prep Type: Total/NA

**Matrix: Water** 

**Analysis Batch: 83882** 

,	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Aluminum	5000	5100		ug/L		102	80 - 120	
Chromium	1000	1010		ug/L		101	80 - 120	

Lab Sample ID: LCSD 360-83882/13 Client Sample ID: Lab Control Sample Dup Prep Type: Total/NA

**Matrix: Water** 

Analysis Batch: 83882

	Spike	LCSD	LCSD			%Rec.		RPD
Analyte	Added	Result	Qualifier Unit	D	%Rec	Limits	RPD	Limit
Aluminum	5000	5030	ug/L	. –	101	80 - 120	2	20
Chromium	1000	994	ug/L		99	80 - 120	1	20

Lab Sample ID: 360-37596-1 MS Client Sample ID: OC-GW-26 **Matrix: Water Prep Type: Dissolved** 

**Analysis Batch: 83882** 

•	Sample	Sample	Spike	MS	MS				%Rec.	
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Aluminum	ND		5000	4540		ug/L		91	75 - 125	
Chromium	6.1		1000	909		ug/L		90	75 - 125	

Lab Sample ID: 360-37596-1 DU Client Sample ID: OC-GW-26 **Prep Type: Dissolved** 

**Matrix: Water** 

Analysis Batch: 83882

•	Sample	Sample	DU	DU					RPD
Analyte	Result	Qualifier	Result	Qualifier	Unit	D	R	PD	Limit
Aluminum	ND		ND		ug/L		1	IC	20
Chromium	6.1		5.82		ug/L			5	20

Method: 300.0 - Chloride & Sulfate

Lab Sample ID: MB 360-84104/3 Client Sample ID: Method Blank Prep Type: Total/NA

**Matrix: Water** 

Analysis Batch: 84104

	MB	MB							
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	ND		2.0	2.0	mg/L			11/21/11 17:49	1
Chloride	ND		1.0	1.0	mg/L			11/21/11 17:49	1

Lab Sample ID: LCS 360-84104/4 **Client Sample ID: Lab Control Sample** 

**Matrix: Water** 

**Analysis Batch: 84104** 

-	Spike	LCS	LCS				%Rec.
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits
Sulfate	80.0	81.1		mg/L	_	101	85 - 115

TestAmerica Westfield 12/2/2011

Prep Type: Total/NA

Method: 300.0 - Chloride & Sulfate (Continued)

Client Sample ID: Lab Control Sample

85 - 115

Prep Type: Total/NA

Prep Type: Total/NA

Prep Type: Total/NA

Prep Batch: 84076

**Matrix: Water Analysis Batch: 84104** 

Analyte Chloride

Lab Sample ID: LCS 360-84104/4

LCS LCS Spike Added Result Qualifier Unit D %Rec Limits

mg/L

40.7

%Rec.

102

Method: L107-06-1B - Nitrogen Ammonia

Lab Sample ID: MB 360-83810/1-A Client Sample ID: Method Blank

**Matrix: Water** Prep Type: Total/NA **Analysis Batch: 83913** Prep Batch: 83810

40.0

MB MB

Result Qualifier RL Analyte RL Unit Prepared Analyzed Dil Fac 0.10 Ammonia ND 0.10 mg/L 11/23/11 09:19 11/23/11 14:25

Lab Sample ID: LCS 360-83810/2-A Client Sample ID: Lab Control Sample

**Matrix: Water** Prep Type: Total/NA **Analysis Batch: 83913** Prep Batch: 83810

Spike LCS LCS %Rec. Analyte Added Result Qualifier Unit D %Rec Limits 10.0 10.4 mg/L 90 - 110 Ammonia 104

Lab Sample ID: MB 360-84076/1-A Client Sample ID: Method Blank

**Analysis Batch: 84183** 

MR MR Qualifier Unit Analyte Result Prepared Analyzed

0.10 11/30/11 10:45 Ammonia ND 0.10 mg/L 11/30/11 16:18

Lab Sample ID: LCS 360-84076/2-A Client Sample ID: Lab Control Sample

**Matrix: Water** Prep Type: Total/NA **Analysis Batch: 84183** Prep Batch: 84076

LCS LCS Spike %Rec. Analyte Added Result Qualifier Unit D %Rec Limits 10.0 Ammonia 9 85 99 90 \_ 110 mg/L

Method: SM 2510B - Conductivity, Specific Conductance

Lab Sample ID: MB 360-83626/3 Client Sample ID: Method Blank

**Matrix: Water Analysis Batch: 83626** 

**Matrix: Water** 

MB MB

Analyte Result Qualifier RL RI Unit Analyzed Dil Fac D Prepared Specific Conductance ND 1.0 1 0 umhos/cm 11/19/11 08:19

Lab Sample ID: LCS 360-83626/1 Client Sample ID: Lab Control Sample

**Matrix: Water** Prep Type: Total/NA

Analysis Batch: 83626 Spike LCS LCS %Rec.

Added Result Qualifier Limits Analyte Unit %Rec Specific Conductance 1410 1400 umhos/cm 85 - 115

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**Analytical Dilution Preparation Log** 

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**Analytical Dilution Preparation Log** TestAmerica Westfield

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**Analytical Dilution Preparation Log** 201 TestAmerica Westfield Analyst Initials 11-05-11 Date ともろ Method

34596AKA LIMs Sample ID RUZ AKA RSA 6× 40) Rpt'd Dil. エメ X 2,5 Sample Allquot 1 23 100 EX.T (m) ž Units Final Volume 1 ઈ 6 ઈ 6 120 M なりなり 2 Units Sample Aliquot 2 Units Serial Dilution Final Volume 2 Units 11-30-11 Comments

entries completed by day [ new page each day]

TestAmerica Job ID: 360-37596-1

Client: Olin Corporation Project/Site: Olin Chemical

Lab Sample ID: 360-37596-1

Matrix: Water

Client Sample ID: OC-GW-26 Date Collected: 11/11/11 09:35

Date Received: 11/11/11 17:25

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B			83882	11/23/11 14:22	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83626	11/19/11 08:45	AMS	TAL WFD
Total/NA	Prep	Distill/Ammonia			83810	11/23/11 09:19	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		10	83913	11/23/11 15:08	RWE	TAL WFD
Total/NA	Analysis	300.0		1	84104	11/21/11 19:58	RWE	TAL WFD
Total/NA	Analysis	300.0		10	84104	11/21/11 20:14	RWE	TAL WFD

Client Sample ID: OC-GW-10s Lab Sample ID: 360-37596-2

Date Collected: 11/11/11 10:20 Matrix: Water

Date Received: 11/11/11 17:25

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B			83882	11/23/11 14:34	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83626	11/19/11 08:46	AMS	TAL WFD
Total/NA	Analysis	300.0		1	84104	11/21/11 21:35	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			84076	11/30/11 10:45	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		1	84183	11/30/11 16:26	RWE	TAL WFD

Client Sample ID: OC-GW-76s Lab Sample ID: 360-37596-3

Date Collected: 11/11/11 11:25 Matrix: Water

Date Received: 11/11/11 17:25

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B			83882	11/23/11 14:37	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83626	11/19/11 08:48	AMS	TAL WFD
Total/NA	Analysis	300.0		1	84104	11/21/11 22:07	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			84076	11/30/11 10:45	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		1	84183	11/30/11 16:27	RWE	TAL WFD

Client Sample ID: OC-GW-24 Lab Sample ID: 360-37596-4

Date Collected: 11/11/11 09:35 Matrix: Water

Date Received: 11/11/11 17:25

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B			83882	11/23/11 14:40	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83626	11/19/11 08:49	AMS	TAL WFD
Total/NA	Analysis	300.0		1	84104	11/21/11 22:39	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			84076	11/30/11 10:45	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		4	84183	11/30/11 16:52	RWE	TAL WFD

### **Lab Chronicle**

Client: Olin Corporation Project/Site: Olin Chemical TestAmerica Job ID: 360-37596-1

Lab Sample ID: 360-37596-5

Matrix: Water

Client Sample ID: OC-GW-25 Date Collected: 11/11/11 08:35

Date Received: 11/11/11 17:25

Batch

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B		1	83882	11/23/11 14:43	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83626	11/19/11 08:51	AMS	TAL WFD
Total/NA	Analysis	300.0		10	84104	11/21/11 20:46	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			84076	11/30/11 10:45	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		4	84183	11/30/11 16:53	RWE	TAL WFD

### Laboratory References:

TAL WFD = TestAmerica Westfield, Westfield Executive Park, 53 Southampton Road, Westfield, MA 01085, TEL (413)572-4000

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# **Certification Summary**

Client: Olin Corporation Project/Site: Olin Chemical TestAmerica Job ID: 360-37596-1

Laboratory	Authority	Program	EPA Region	Certification ID
TestAmerica Westfield	Connecticut	State Program	1	PH-0494
TestAmerica Westfield	Maine	State Program	1	MA00014
TestAmerica Westfield	Massachusetts	State Program	1	M-MA014
TestAmerica Westfield	New Hampshire	NELAC	1	2539
TestAmerica Westfield	New York	NELAC	2	10843
TestAmerica Westfield	North Carolina	North Carolina DENR	4	647
TestAmerica Westfield	Rhode Island	State Program	1	LAO00057

Accreditation may not be offered or required for all methods and analytes reported in this package. Please contact your project manager for the laboratory's current list of certified methods and analytes.

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			rimary Accredit	ation is Carried
Method Name	Description	New Hampshire (NELAC)	Mass	Conn
821-R-02-012	Toxicity, Acute (48-Hour)(list upon request)	NP		
SM 4500 CI F	Chlorine, Residual		NP P	
SM 9215E	Heterotrophic Plate Count (SimPlate)		P/NP	
SM 9222D	Coliforms, Fecal (Membrane Filter)		P/NP	
SM 9223	Coliforms, Total, and E.Coli (Colilert-P/A)		<u>Р</u>	
SM 9224 1103.1	Coliforms, Total, and E.Coli (Enumeration)  E.coli			
Enterolert	Enterococcus		ambient/ source	
200.8 Rev 5.4	Metals (ICP/MS) (list upon request)	NP/P	NP/P	
200.7 Rev 4.4	Metals (ICP)(list upon request)	NP/P	NP/P	
6010B/C	Metals (ICP)(list upon request)	NP/SW		
245.1	Mercury (CVAA)	NP/P	NP	
7470A	Mercury (CVAA)	NP		
7471A	Mercury (CVAA)	SW		
SM 2340B	Total Hardness (as CaCO3) by calculation	NP/P	NP	
3005A	Preparation, Total Recoverable or Dissolved Metals	NP/P		
3010A	Preparation, Total Metals	NP/P		
3020A	Preparation, Total Metals	NP/P/SW		
3050B	Preparation, Metals	SW		
504.1	EDB, DBCP and 1,2,3-TCP (GC)	Р	Р	
608	Organochlorine Pest/PCBs (list upon request)	NP	NP	
625	Semivolatile Org Comp (GC/MS)(list upon request)	NP	NP	
3546	Microwave Extraction	SW		
3510C	Liquid-Liquid Extraction (Separatory Funnel)	NP		
3550B	Ultrasonic Extraction	SW		
8081AB	Organochlorine Pesticides (GC)(list upon request)	NP/SW		
8082/A	PCBs by Gas Chromatography(list upon request)	NP/SW		
8270C/D	Semivolatile Comp.(GC/MS)(list upon request)	NP/SW		
CT ETPH	Conn - Ext. Total petroleum Hydrocarbons (GC)	NP/SW		NP/SW
MA-EPH	Mass - Extractable Petroleum Hydrocarbons (GC)	NP/SW		
524.2	Volatile Org Comp (GC/MS)(list upon request)	Р	P	
524.2	Trihalomethane compounds	P	P	
624	Volatile Org Comp (GC/MS)(list upon request)	NP	NP	
5035	Closed System Purge and Trap	SW NP		
5030B	Purge and Trap	NP/SW		
8260B/C MAVPH	Volatile Org Comp. (GC/MS)(list upon request)	INP/SVV		
	Mass - Volatile Petroleum Hydrocarbons (GC)	P	Р	
180.1 300	Turbidity, Nephelometric	NP/P	NP/P	
410.4	Anions, Ion Chromatography COD	NP NP	NP.	
1010	Ignitability, Pensky-Martens Closed-Cup Method	SW		
10-107-06-2	Nitrogen, Total Kjeldahl	NP NP	NP	
7196A	Chromium, Hexavalent	NP/SW		
9012A	Cyanide, Total and/or Amenable	NP/SW		
9030B	Sulfide, Distillation (Acid Soluble and Insoluble)	NP		
9045C	pH	SW		
L107041C	Nitrogen, Nitrate	NP	Р	
L107-06-1B	Nitrogen Ammonia	NP	NP	
L204001A CN	Cyanide, Total	Р	NP/P	
L210-001A	Phenolics, Total Recoverable	NP	NP	
SM 2320B	Alkalinity	NP/P	NP/P	
SM 2510B	Conductivity, Specific Conductance	NP/P	NP/P	
SM 2540C	Solids, Total Dissolved (TDS)	NP/P	NP/P	
SM 2540D	Solids, Total Suspended (TSS)	NP	NP	
SM 3500 CR D	Chromium, Hexavalent	NP		
SM 4500 H+ B	pH	NP/P	NP/P	
SM 4500 NO2 B	Nitrogen, Nitrite	NP	Р	
SM 4500 P E	Phosphorus, Orthophosphate	NP/P	NP	
SM 4500 P E	Phosphorus, Total	NP	NP	
SM 4500 S2 D	Sulfide, Total	NP	No.	
SM 5210B	BOD, 5-Day	NP NP	NP	
SM 5310B	Organic Carbon, Total (TOC)	NP/P	NP	i

Not all organic compounds are accreditied under NELAC

For methods with multiple compounds all compounds may not meet NELAC criteria, listing should be obtained from the laboratory The lab carries additional accreditations with several states. This is the laboratories typical listing but is subject to change based on the laboratories current certification standing.

# **Login Sample Receipt Checklist**

Client: Olin Corporation Job Number: 360-37596-1

Login Number: 37596 List Source: TestAmerica Westfield

List Number: 1

Creator: Beaumier, Janine E

Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	N/A	
The cooler's custody seal, if present, is intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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Coolei/Temperature(s) C and Other Remarks:

Received

Company Company

CC-CC-C Date/Time: // -// -// Date/Time:

Custody Seals,Intact: | Custody Seal No.:

TAL-8245-360 0310

500

| | - ( - ( ( )

Date/Time

THE LEADER IN ENVIRONMENTAL TESTING

Carrier Tracking No(s)

Mason

Bosky

Lab PM:

C. Mazzalin: 18 mm

Phone:

Chain of Custody Record

Westfield Executive Park 53 Southampton Road

**TestAmerica Westfield** 

Phone (413) 572-4000 Fax (413) 572-3707

Westfield, MA 01085

Janes

Client Information

S

Company:

Address:

986

184590

Analysis Requested

J - DI Water M - Hexane N - None P - Na204S

A - HCL B - NaOH

CT RSR EDD Required

Total Number of confainers

Special Instructions/Note:

W

X

**Sartorm MS/MSD?** 

(Wewator, Sesolid, Oewasto/oil, BT+Tissue,

Sample Type (C=comp, G=grab)

Sample Time

Sample Date

A-AIr)

Preservation Code:

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Sample Identification

H - Ascorbic Acid S - H2SO4 1 - Ice Z - other (specity)

O - Na2SO3 R - Na2S2SO3

C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH

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Quote #:

38 0,0

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State, Zip:

Wilming ten

S- Marie

SSOW#

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Project Name/number;

\* OM ₽0 #

TAT Requested (days): Due Date Requested:

**TestAmerico** 

Months

Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)

Return To Client Disposal By Lab Archive For Mon

Special Triskuctions/QC Requirements:

Radiological

Unknown

Poison B

Skin Imitant

Deliverable Requested: I, II, III, IV. Other (specify)

Rolinguist

Non-Hazard Teammable

Possible Hazard Identification